

FY 2018-19 Information Technology Capital Budget Requests November Prioritized Submission

OSP Priority	Agency	Project Title	Project Type	Request Amount -- CCF	Request Amount -- CF	Outyear?
1	Human Services	IT Systems Interoperability	Continuation	50,000	450,000	Yes
2	Office of Information Technology	Human Resource Information System	Continuation	7,414,260	0	No
3	Office of Information Technology	Strategic IT Infrastructure Needs	New	5,122,000	0	Yes
4	Education	Information Management System Updates	New	2,331,000	0	No
5	Public Health and Environment	Electronic Birth Registration System Replacement	Previously Requested	745,000	1,695,000	No
6	Office of eHealth Innovation	Health IT Roadmap Initiatives	New	1,875,500	4,729,500	Yes
CF	Natural Resources	Law Enforcement Records Management System	New	0	2,523,326	No
Total recommended for funding by OSPB:				17,537,760	9,397,826	
44*	Pikes Peak Community College	Campus Emergency Notification and Power	New	524,865	0	No
45*	Community College of Denver	Storage and Virtualization	New	1,005,344	124,260	No
46*	Lamar Community College	Technology Infrastructure	New	769,886	15,000	No
47*	Trinidad State Junior College	Technology Infrastructure	New	615,310	0	No
48*	Pueblo Community College	Security Intrusion Detection and Internal Door Access	New	815,000	0	No
49*	Otero Junior College	Technology and Communication Upgrades	New	543,300	0	No
Grand total:				\$21,811,465	\$9,537,086	

CF = Recommended for funding from cash sources.

*Prioritized for funding along with capital construction projects, which are considered by the Capital Development Committee.

Fiscal Year 2018-19 Information Technology Request

Education

Information Management System Updates

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-148

Approved Program Plan?

N/A

Date Approved:

The Colorado Department of Education (CDE) says that the Governor's Office of Information Technology (OIT) was consulted throughout the development of the budget request, and it aligns with OIT's best practices for security, equipment replacement, and maintenance.

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
OSPB	4 of 7	Recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$2,331,000	\$0	\$0	\$2,331,000
Total	\$0	\$2,331,000	\$0	\$0	\$2,331,000

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$1,169,000	\$0	\$0	\$1,169,000
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$630,000	\$0	\$0	\$630,000
Miscellaneous	\$0	\$80,000	\$0	\$0	\$80,000
Contingency	\$0	\$0	\$0	\$0	\$0
Software Acquisition	\$0	\$452,000	\$0	\$0	\$452,000
Total	\$0	\$2,331,000	\$0	\$0	\$2,331,000

PROJECT STATUS

This is a new, never-before-requested project.

PROJECT DESCRIPTION / SCOPE OF WORK

CDE is requesting state funds for three major components to update its information management systems: (1) infrastructure maintenance; (2) security infrastructure and data privacy improvements; and (3) improved public and district data reporting and other improvements.

Infrastructure maintenance. CDE says that funding for this component represents the cost for system maintenance and hardware and system upgrades, such as firewall upgrades. The department says that this component also includes changing its Record Integration Tracking System (RITS), which assigns and tracks unique student identifiers, and upgrading the department's website in order to comply with requirements of the Office of Civil Rights.

Security infrastructure and data privacy improvements. This portion of the project will improve the department's IT security operations and hire security experts in threat management, privacy, and cybersecurity in order to mitigate

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the risk of data breaches and improve system availability. The department says that the Student Data Transparency and Data Privacy Act requires the confidentiality of student and educator data. This component consists of: (1) firewall upgrades; (2) moving systems to OIT's data center; (3) implementing multifactor authentication; and (4) data masking.

Improved public and district data reporting and other systems. This component consists of: (1) upgrading and modernizing the department's seven-year-old public-private data reporting processes and systems; and (2) a feasibility study to examine a new statewide student data system that would assist rural districts and the Boards of Cooperative Educational Services. A new requirement under the reauthorization of the No Child Left Behind, Every Student Succeeds Act is a parent-friendly report card, which requires a new way of collecting, storing, and providing data back to the public.

PROJECT JUSTIFICATION

CDE explains that the projects will: (1) update and replace critical, aging systems; (2) establish an ongoing maintenance cycle; and (3) improve information technology security.

Infrastructure maintenance. The department says that it needs funding to pay for required hardware and software maintenance, and update one of its most obsolete, mission critical systems, the RITS, which is a 15-year-old system that assigns and tracks student identifiers. This component also addresses the Office of Civil Rights requirement that the department update its website to ensure that all residents and stakeholders have access to district reporting and services in a manner that is secure, accurate, and actionable.

Security infrastructure and data privacy improvements. The department says that investing in security prevention is more cost effective than remediation after a breach incident has occurred.

Improved public and district data reporting and other systems. The department says that its existing systems sometimes do not provide data in a timely manner, which has the potential to delay decisions made by the department.

The department says that it consults with other state education agencies across the country. Discussions include technical solutions as well as processes, procedures, and contractual solutions. The department also says that in its discussions with OIT, both CDE and OIT agree that the items in this budget request are the best options for updating its outdated IT systems. The department explains that improving its user access control is a high priority because of current security threats. Also, the department says it has the building blocks in place to add multifactor authentication to the existing system. CDE explains that numerous data reporting tools exist and that alternatives will be evaluated through the department's solicitation process (e.g., through a request for proposal) and its enterprise contracting process.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

CDE regularly reports data to a wide variety of entities. CDE explains that implementation plans for each component will be developed in collaboration with program units across the department. According to CDE, the three components in the budget request align directly with the department's performance plan. The department explains that CDE systems provide information and insight to legislators, the public, school districts, and the department through reports, such as growth data. This information impacts education policy statewide. CDE says that its goal is to collect data from the districts efficiently, and implement security controls and practices that protect student data.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

CDE states that two of the components, (1) infrastructure maintenance and (2) security infrastructure and data privacy improvements, are risk mitigation strategies. These two components will maintain current operations and mitigate the risk of system failures and data breaches. CDE explains that it needs the ability to pay for software and hardware maintenance. For example, a vendor may not be able to assist with a system failure if that system is not current or supported by the vendor. Additionally, installing security patches is essential in protecting the systems that record, store, and track student data.

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The department states that the third component, improved public and district data reporting, will result in reduced waiting time for customers and business users. The department explains that it receives requests to provide information in various formats. CDE says that improving its data reporting will provide more value from the raw data it collects. CDE further explains that districts must provide reports mandated by law, and this project will help facilitate those requirements. Finally, the proposed feasibility study will explore opportunities to provide relief and support to the state's rural areas.

SECURITY AND BACKUP / DISASTER RECOVERY

The department's budget request consists of a security component to move systems to OIT's data center, implement security controls, hire security subject matter experts, and incorporate multifactor authentication.

BUSINESS PROCESS ANALYSIS

The department explains that it prioritized items based on cost, need, and criticality. CDE explains that some of its priorities include: (1) maintaining existing systems with minimal enhancements; (2) modernizing the 15-year-old student identification system (RITS); and (3) improving security and threat prevention.

PROJECT SCHEDULE

Component	Start Date	Completion Date
Infrastructure and Maintenance		
-Vendor Maintenance	January 2018	December 2019
-Ongoing Maintenance	July 2019	June 2021
-Record Integration Tracking and Educator ID Systems	July 2018	June 2019
Security Infrastructure and Data Privacy Improvements		
-Firewall Upgrades	July 2018	December 2018
-OIT Data Center Migration	July 2018	June 2019
-Multifactor Authentication Implementation	January 2019	June 2019
-Data Masking	July 2018	June 2019
Improved Data Reporting		
-CDE Reporting Tool Upgrade	July 2018	May 2019
-Rural Schools and Districts Study	July 2018	May 2019

OPERATING BUDGET

The department has submitted an associated FY 2018-19 operating budget request to the Joint Budget Committee to hire 3.0 FTE (\$462,865 GF). CDE plans to hire two FTE as security subject matter experts and one FTE to modernize and re-design its public and private data reporting processes and systems. Beginning in FY 2019-20, CDE expects annual maintenance costs to be \$115,000 for firewall and other system maintenance. For FY 2021-22, the annual maintenance costs may increase to \$580,000 for a one-time refresh cycle. The department says that a future operating budget request will be submitted to pay for these costs, if the project is approved.

STAFF QUESTIONS AND ISSUES

See attached.

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Colorado Department of Education (CDE) IT Capital Construction Information Management System Updates

Joint Technology Committee (JTC) Staff Questions

- For FY 2018-19, the budget request includes \$1,621,000 for *consultants / contractors*. Are these term-limited resources or full-time employees (FTEs)? If FTEs, does the department plan to submit these operating expenses to the Joint Budget Committee? If term-limited resources, please provide the project role, hourly rates, and planned time period used to calculate each consultant / contractor required for this project.

These are term limited contracted resources, and will require multiple individuals per project, or teams from qualified vendors, projected blended hourly rates:

<i>Project</i>	<i>Role</i>	<i>Total</i>	<i>Hourly Rate</i>	<i>Hours</i>
<i>Identity Management</i>	<i>Identity and Access Management (IAM) Architect</i>	<i>187,000.00</i>	<i>130</i>	<i>720</i>
			<i>130</i>	<i>720</i>
<i>Student Data Security</i>	<i>Database Administrator (2)</i>	<i>360,000.00</i>	<i>130</i>	<i>1800</i>
<i>Student Data Reporting</i>	<i>Data Reporting Architect (sr. and jr.)</i>	<i>138,000.00</i>	<i>130</i>	<i>800</i>
			<i>85</i>	<i>400</i>
<i>Rural Relief</i>	<i>Policy Analyst</i>	<i>120,000.00</i>	<i>70</i>	<i>160</i>
	<i>Project Manager</i>		<i>100</i>	<i>960</i>
	<i>PL/SQL/Java Developer</i>		<i>85</i>	<i>151</i>
<i>Student/Educator ID</i>	<i>PL/SQL/Java Developer</i>	<i>364,000.00</i>	<i>85</i>	<i>900</i>
	<i>ETL Developer</i>		<i>90</i>	<i>900</i>
	<i>Business Analyst</i>		<i>100</i>	<i>750</i>
	<i>Data Analyst</i>		<i>100</i>	<i>700</i>
	<i>Project Manager</i>		<i>100</i>	<i>600</i>

- Based on criticality and security, please prioritize each of the three project parts with a sequential, unique number, with number 1 being the highest priority. For each major milestone, summarize the critical need and security vulnerabilities, along with any dependencies.

a) *Infrastructure and Software Upgrades, project CDE001*

The department's infrastructure is at its current location the State Office Building, and the cost to bring the current facility up to data center standards is not practical, noting that a class four data center is already in place for state agencies to collocate. Current budget levels have lagged behind annual maintenance increases requiring additional funding to keep existing systems in place.

b) *Security and Data Privacy, project CDE002*

The constant and ongoing threat to CDE is social engineering, attackers attempting to compromise an actual user's account to breach systems. As has been seen in other sectors, username and password are no longer sufficient to properly secure sensitive data.

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c) *Improved Public and District Reporting, project CDE003*

Local Educational Agencies and other stakeholder groups are seeking data for better decision support and accountability of systems and techniques in practice. New visualization technologies enable very detailed and granular reporting, and avoiding secondary identification of individuals.

These three projects are not dependent upon each other.

3. The FY 2018-19 budget request explains that the *Statewide Longitudinal Data Systems* federal funds ended in 2014. Please summarize which portions of the project that these federal funds covered in the past and the portions of the project that are new. Has the department researched how other states manage technical needs without the *Statewide Longitudinal Data Systems* federal funds? Please explain.

CDE was awarded two SLDS grants in the past, one in 2004 and again in 2009. Both grants were used to address critical system development lifecycle needs for the department. They included technology investments in identity management, LEA data collection and LEA data reporting. The 2009 SLDS grant included funding for collection of data (called "Capture"), connecting of data (called "Link", connecting data internal / external to CDE) and making resulting data available to stakeholders (called "Provide"). Those efforts addressed both current and longitudinal data acquisition requirements for the department. Note that the last phase, called "Provide" did not include purchase of new reporting tools, but funded work required to integrate the new "Capture" and "Link" tools with existing reporting systems.

IMS takes advantage of national no cost State level knowledge exchange options associated with the National Center for Education Statistics (NCES) SLDS program, and Chief State School Officers (CCSSO) Education Information Management Advisory Consortium (EIMAC) support organizations. The CIO and her staff stay abreast of similar state projects and opportunities to leverage as much intellectual property across states or to achieve as much economies of scale as possible. This is done through both formal and informal channels with those groups. As an example, the national group of CIO's have created a "CIO Portal", which contains information on systems each state uses, vendors they do business with, examples of contracts in place, costs incurred for services and products, documents of interest and other information that could be helpful to share. This provides each state a central location to research prior to making new purchases or investigating potential products or services, and gives each CIO a much better position from which to negotiate prices (e.g., if state x only pays \$10 to vendor a, then when vendor a tries to charge state y \$100 for those same services, state y's knowledge of that lower rate allows the CIO to negotiate down to a comparable lower price). This portal is still being populated, but has already proven to be very valuable. This collaborative effort also demonstrates the willingness of state education agencies' CIOs to work together and share whatever possible, up to and including system design and code.

Even states who do still have SLDS funding participate in this collaborative effort, so if it's possible for the non-funded states to take advantage of gains made using those federal funds, those opportunities will be explored. Each state education CIO understands the funding challenges within state government and even more so within the education industry. So we understand the value that can be achieved by working together and sharing information and solutions wherever possible.

4. Has the department considered Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), or Infrastructure-as-a-Service (IaaS) for any parts of the project? Please provide details explaining the decision for the current project approach.

The department has several SAAS platforms, including the statewide teacher evaluation system, the special education individual educational plan management system, the facility

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school student information system, endpoint security, and several other smaller specialty systems. Typically, SAAS is considered first going forward for any new or replacement systems.

These projects are enhancements to existing systems, noting the custom nature and complexity of these systems when built. At that time, SAAS offerings were not available, so that capacity was built in house. These requests are for upgrading and enhancing systems already in place. However, SAAS offering will be considered in the future when they are available and the lifecycle of the existing systems require replacement. The current state of education software in the SAAS space is lagging behind other sectors, for example, a turnkey educator/student ID platform does not exist, identity and access management (IAM) offerings are promising, and data base cloud offerings will likely be in play the next time that infrastructure is due for replacement.

PAAS has been considered, but because of the unique development and integration requirements at CDE, vendor(s) offerings with that maturity level might not exist, but the future is promising. Additionally, migrating to a PAAS solution would be a considerable project requiring additional resources outside the scope of this request, to accommodate business model changes on the provided service platform. The availability of enterprise PAAS offerings that meet CDE requirements is monitored for the necessary maturity level, and will be considered in the future. Please note, however, that there could still be maintenance impacts (ie, ongoing costs) when employing a PAAS model, albeit perhaps not as extensive as custom built in house.

E-fort consolidation aligns with the benefits of a private IAAS – that facility is offered to state agencies by OIT via a collocation contract with ViaWest – this is in lieu of CDE contracting separately or the considerable expense to bring the current facility up to industry standards for data centers, while not a full cloud IAAS implementation, it puts CDE on that path when a full technology refresh is due and it meets requirements.

In summary these projects are for critical security upgrades and maintenance of existing systems, the path to services offerings is a future project with a much larger scope. These enhancements and upgrades do not put that at risk, but are a necessary interim step. Additionally, CDE is entrusted with very sensitive data with extensive legal and regulatory requirements, and service cloud offerings must be considered very carefully when moving such data to the cloud, however, such a migration will most likely be the next iteration for CDE. But the current offerings must mature for a few years first. Also, such a migration would take multiple years and require significant investment and planning.

5. Senate Bill 17-304 requires that budget requests submitted to the JTC should include: (1) information from a request for information (RFI) or other formal market research regarding the information technology budget request; and (2) any other available and relevant information obtained from the market research related to the information technology budget request. Has the department published any RFIs or conducted any market research for the project? If so, please indicate which project milestones the RFI or market research covered. If not, please explain.

As has been stated before, the bulk of this funding request is not about a particular “solution” for which multiple vendors are likely to bid. Instead, most of the funding will go towards contract services to provide additional capacity to take better advantage of the tools already in place. As a side note, however, CDE’s IMS staff is continually evaluating options on the market that could provide better or less expensive services. This is done informally as a regular course of business.

6. The department’s FY 2018-19 budget request includes funding for a feasibility study to examine a statewide student data system that would potentially assist rural districts and Boards of

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Cooperative Educational Services. This statewide data system may reduce the IT burden of locally implementing and maintaining individual systems. Does the department anticipate submitting another capital construction budget request after the feasibility study has concluded? Describe any aspects of this project that would be impacted by this study.

This particular component of the budget request will enable the department to work with rural districts to identify pros and cons of a potential state-wide Student Information System, and will also explore other options that might relieve the burden that data reporting imposes on districts. Part of the scope of this study will be to evaluate possible funding models for recommendations made, e.g., there could be some cost-sharing with districts. But until the study is completed, the actual costs and recommended funding model is unknown. Should the results of this study recommend that a major system implementation be undertaken, and no other funding source is identified, then yes, there could be another capital construction budget request submitted in the future.

7. The department says that the Office of Civil Rights has required that the department update its website so that residents and stakeholders have access to district reporting and services. Is this a federal requirement? Did the department receive a mandated deadline to complete this requirement? What is the penalty or remedy if the department does not comply?

Please find attached the documentation related to the Office of Civil Rights findings and CDE's responses to that. The resolution agreement with the Office of Civil Rights finds that the department violated the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 by failing to ensure that our website – which serves as a gateway to the programs and support we provide to the districts, schools, teachers and students of Colorado – provides equal opportunities to people with disabilities. The resolution agreement outlines a timeline that is partly dependent on responses from the Office of Civil Rights. The department has met all of its deadlines. We have not received a response from the Office of Civil Rights to our plans for new content and corrective action plan, including our undue burden request. However, we are proceeding with all accessibility updates and requirements for training, etc. that are possible with existing resources. The OCR Agreement states the following: "OCR may initiate administrative enforcement or judicial proceedings to enforce the specific terms and obligations of this Agreement."

8. Referring to question number 10, the department explains the importance of multifactor authentication. Depending on the method the department implements and any resources available the department may be able to leverage, multifactor authentication can require a significant initial and ongoing maintenance cost. Please provide more information about the type of multifactor authentication the department plans to implement and the line item in the budget request that includes these costs.

The department has already implemented Oracle Identity and Access Management (IAM) suite, the adaptive two factor module is included in the department's license, this is \$187,200 for consulting developer resources to configure that module.

9. On page 3 of the budget request, the department explains that it has consulted with OIT throughout the development of the request, and the budget request aligns with OIT's best practices around security, equipment replacement, and maintenance. Did OIT review all three components of the budget request? Please summarize how the three components align with OIT best practices.

Yes, OIT did review all three components of the budget request. The full request, including FTE, was provided to and discussed with OIT's CIO, CISO and CFO. We also provided additional supporting details for them, to answer any follow up questions they had. Like OIT, CDE follows industry best practices, which inherently aligns our two agencies.

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The first component of our budget request, additional funding to pay escalating maintenance on vendors, is not so much a “best practices” discussion, as it is just the reality of the software/hardware industry. OIT faces the same challenge, confronted by escalating maintenance charges every year without a budget originally built to accommodate that escalation.

The other components of the request, however, do lend themselves to best practices methodologies. In second component of this budget request, the information security infrastructure, both OIT and CDE are implementing single sign-on systems, with multi-factor authentication. These types of systems that manage the identification and authentication of users are used across the industry, in any situation where the data is extremely sensitive and potentially profitable to bad actors, e.g., online banking. The difference between CDE and OIT is that CDE already has this type of system in place, and is seeking only to strengthen the security within it. OIT is just now implementing a state-wide system, and is currently in a pilot phase. So it would be a number of years before CDE could take advantage of OIT’s solution. But both solutions align with industry best practices.

Another factor that CDE must take seriously is the categorization of student data. OIT aligns with industry best practices and categorizes Personally Identifiable Information (PII) as medium risk, and uses controls suitable to that level of risk. CDE, however, must categorize student PII as high risk, due to the importance to the education community of that data, and also because state law restricts CDE from identifying individual students. OIT is not bound by that law, so is not held to that same standard. That means they can stick with the general industry standard which classifies PII as medium risk. This is an example where CDE must go beyond industry standards and take extra precautions for maintaining the security of student data. Please note that both CDE and OIT are following best practices in this area.

CDE’s third budget component, improving data reporting, is another area where CDE seeks to align with industry best practices. 7-year old data reporting systems are not considered industry standards, and OIT does not recommend systems of that age should be used for high stakes data reporting needs. OIT uses interactive data reporting tools when their business users require that level of sophistication. When choosing reporting tools and methods, the needs of the business users must be considered carefully. In some cases, static and printable reports are the best way to provide information to CDE’s stakeholders and users. CDE has district users who can take advantage of that sort of information delivery, for status and feedback on their data submission process. But there are also many other users that are requesting more sophisticated reports, that allow them to slice and dice the data in different ways for their own analysis. Examples of this might be parents who are reviewing performance results of multiple schools to help make school selections and also district users who are well versed in reporting and in their own data, who want to examine data in different ways. This allows others to create their own reports, freeing up CDE resources to provide other technology services. If we do not receive the requested funding, then the demands on CDE will continue to rise and CDE staff will become the bottleneck between data demands and supply, making it a more FTE intensive role moving forward. This is not efficient, effective or elegant.

10. House Bill 15-1266 requires all information technology budget requests to identify and quantify anticipated administrative and operating efficiencies or program enhancements and service expansion through cost-benefit analyses and return-on-investment calculations. CDE has provided planned annual operating costs; however, please also provide potential cost savings, and a return on investment calculation or cost benefit analysis, if available. Please quantify any assumptions used.

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The first two components of this request, the Catch up Maintenance of Infrastructure and the Security Infrastructure and Data Privacy Improvements should be evaluated as risk mitigation strategies. These are not projects that will add functionality to reduce time in manual processing but are efforts required to maintain the current operations, and to mitigate the risk of system failures and/or data breaches.

If CDE systems are allowed to go un-supported, which is what will happen if we cannot pay the escalating vendor maintenance payments, then our technical staff will be unable to call on vendors for technical assistance and eventually systems will fail. More importantly, without current patching, we would not receive the regular security patches that are required to keep our systems secure and protected from the latest “back doors” discovered by hackers. That could expose our student data. Because the cost of a data breach generally averages about \$80 per record in the public sector, with our 900,000 students we could be looking at costs in excess of \$72M should we suffer a data breach. Our approach to this challenge has been to minimize the threat of breaches as much as possible, by applying industry recognized activities that are proven to reduce the cost of a breach. A few of these activities we have employed are:

- Extensive use of encryption,*
- Employee training,*
- Use of security analytics,*
- Appointing data privacy and information security officers,*
- Senior leadership involvement,*
- Board involvement*

According to the Ponemon Institute, “2017 Cost of Data Breach Study: Global Analysis” all of these activities are likely to reduce the cost of a data breach. Following that approach to risk mitigation, some of the most basic activities required to prevent breaches in the first place include applying security patches as they come out, and using multi-factor authentication. Both of those are included in what we are requesting funding for.

The third component of this request is expected to save time on the part of our customers, and potentially CDE business users. We receive regular requests from a variety of stakeholders to provide data in different formats and methods. That gives them more opportunities to get value out of the data we collect and report. Because the districts put so much time in to the reporting of data required by law, the department wants to maximize the value to education that it can provide. The requested reporting tools will assist in that effort.

Lastly, the proposed independent study to explore rural relief is an attempt to study the pros and cons of different ways to relieve data burden. Performing a feasibility study and reviewing the advantages of different proposals is an industry best practice designed to help us learn where to focus our funds most effectively.

11. The budget request explains that the project consists of three major parts: (1) Infrastructure and Software Upgrades and Replacements; (2) Security and Data Privacy; and (3) Improved Public and District Data Reporting. Please provide the project’s major milestone start and end dates for each part of the project.

The three components of this request are not “projects”, as projects are generally defined. A project is defined as an effort with defined start and end dates, and for which there are defined deliverables and milestones during that time, and after the end date, no more effort is applied to those deliverables/milestones. Within the three categories in this request, there will be small projects, but the breakdown of the three was meant to help evaluators understand the general purposes to which funds in each category would be applied. That said, the three categories’ timelines are as follows:

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a) *Infrastructure and software upgrades and replacements, or Catch-Up Maintenance of Infrastructure*

- *This category represents funding for payment of vendor maintenance. Those payments would be made as the vendor bills arrive throughout the year, beginning in '18/'19.*
- *The other portion of this category is the upgrade of the Record Integration Tracking and the Educator Identification Systems. Planning and design would begin in July 2018, and depending on the design, completion date will vary between January 2019 and May 2019. It is not anticipated that we will procure a new system, we expect to use existing tools. However, we currently don't have the human capacity to apply to a full re-design and development, so the remaining funds will go towards contract services. Exact timelines will be determined once detailed design is complete.*

b) *Security Infrastructure/Data Privacy Improvements*

- *This category represents funding for improved security controls required to secure our enterprise operations, including district facing systems and underlying networks used by districts and other customers of CDE. These controls are required to maintain the privacy of student and educator data as required by the recently passed Student Data Transparency and Data Privacy Act. Specific components include the following: Firewall upgrades, moving to a secure class four OIT data center, implementing multi-factor authentication for critical applications, and data masking where appropriate, to avoid another potential point of disclosure.*

c) *Improved District Data Reporting and Other System Enhancements*

- *This category represents two primary funding needs. The first is funding necessary for CDE to upgrade the current 7+ year old data reporting tool to one that represents current technology and the other need is funding required to hire an external firm to help CDE examine options with districts to relieve the data burden on rural schools and districts.*
- *For reporting, there will be a "project", for which CDE will run a procurement process and select the most appropriate, state of the art reporting tool that provides graphical, user friendly reports, for districts and parents who are demanding better and more functional data reporting. The RFP will be issued as soon as possible after the fiscal year begins, with a target date of system implementation by late spring 2019. In addition to the tool implementation, the funding will be used for technical assistance to install and implement the tool. One FTE is also requested with skills in the particular tool to join CDE staff as the primary resource responsible for maintenance and operation of the new reporting tool.*
- *Timeline for the rural data burden effort will also begin immediately after the fiscal year begins, however, a planning period will precede actual investment of the requested funds, to determine exactly what skills are required in the external firm to be hired. CDE will work with rural districts to determine the key issues they face and how best to use external resources to evaluate options and conduct feasibility reviews. As an example, many rural districts are requesting that CDE either endorse or procure and manage a state-wide Student Information System. They have expressed interest in this because that model would provide CDE with easier access to their data once the district authorizes the state to access it, thereby removing the effort required on their part to manually transfer data from their local Student Information System to the state's data collection system. As with all large system implementations, there would be pros and cons, so this independent study would take a look at those, and also explore other options believed to help with the small district current burden. The goal for completion*

FY 2018-19 Capital Construction Requests

of this study would be the end of FY19, when results would be disseminated to the State Board of Education, districts and other interested parties.

12. According to the table in the FY 2018-19 budget request on page 4, maintenance costs begin FY 2019-20 for \$137,500 annually. For FY 2019-20, the department requests the annual maintenance of \$137,500, plus an additional \$85,500 for the purchase of servers. Why is the department planning to spend \$150,000 for servers in FY 2018-19, and then \$85,500 for more servers in FY 2019-20? Please include the following details for each server: (1) the corresponding project part and milestone; (2) new or replacement server; (3) server locations (e.g., onsite or co-location); and (4) sever assessment requirements.

Corrected rolled up spreadsheet attached.

The year two \$85,500 amount and software inflation amounts were inadvertently moved over from planning document and may be removed.

Server maintenance is included in the initial investment for the lifecycle of those assets.

The out year amount of \$35,000 is for annual firewall maintenance and service subscriptions.

The \$80,000 out year amount is an ongoing annual increase over current budget to cover price increases for systems already in place.

- a) *The major project milestones are:*
- a. Establish server and security presence at the E-fort data center.*
 - b. Migrate existing virtual servers to E-fort.*
 - c. Decommission legacy data center.*
- b) *These are new servers for the E-fort location, however they would be replacement servers if the department were to remain at its currently location – a hybrid approach, standing the new servers up at E-fort, moving the computing loads real time, and retiring the current servers, which are due for replacement, i.e. both infrastructures will be active in parallel for a period of time.*
- c) *This projects ultimate outcome is all servers, perhaps for a few utility services, be at the collocation E-fort data center.*
- d) *The department is on a structured computing platform which abstracts the underlying server platform from the hardware, then the actual server requirements are handled on as needed at the virtualization layer. This infrastructure is very flexible and easily expanded if anything changes.*

13. Senate Bill 17-304 requires that budget requests submitted to the JTC should include a range of options for completing the project, including the estimated costs for such options. Although the department provided justification for the request, did the department consider any other options to meet the needs of the project? Please include details and cost of the alternatives.

Strengthening our user access control in response to current threats is a high priority. In following cues from the private sector, especially the financial institutions, multifactor authentication is the prevailing solution to simple user name and password. The department has the building blocks for such a system, but needs additional resources to implement, so no alternatives were evaluated, as that would require replacing the entire identity management system instead of adding multifactor to the existing system.

FY 2018-19 Capital Construction Requests

There are numerous data reporting tools, the alternative will be evaluated through a Request for Proposal or enterprise contracting process and be rewarded within the budget established.

The department also consults with other state education agencies across the country, via the EIMAC and NCES organizations mentioned in question #6. Technology solutions are discussed, as well as process and contractual solutions. CDE has also discussed these needs with OIT and whether there are other ways to satisfy the business needs, and it was agreed that this approach is the best option at this time.

Fiscal Year 2018-19 Information Technology Request

Pikes Peak Community College Campus Emergency Notification and Power

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-154

Approved Program Plan?

Date Approved:

Pikes Peak Community College (PPCC), as part of the Colorado Community College System (CCCS), adheres to the system's IT policies and procedures

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
CCHE	30 of 34	
OSPB	44 of 53	Not recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$524,865	\$0	\$0	\$524,865
Total	\$0	\$524,865	\$0	\$0	\$524,865

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$38,220	\$0	\$0	\$38,220
Construction	\$0	\$65,900	\$0	\$0	\$65,900
Equipment	\$0	\$373,030	\$0	\$0	\$373,030
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$47,715	\$0	\$0	\$47,715
Software Acquisition	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$524,865	\$0	\$0	\$524,865

PROJECT STATUS

This is new, never-before-requested project. However, components of this project were requested for FY 2017-18.

Controlled maintenance. PPCC has also submitted a related FY 2018-19 controlled maintenance request for electrical system and emergency generator upgrades, which will be considered by the Capital Development Committee (\$991,956 CCF).

PROJECT DESCRIPTION / SCOPE OF WORK

PPCC is requesting state funds for campus emergency notification and power systems. Areas of improvement include:

- 34 battery backups (all campuses) for IT closets;
- 136 indoor and outdoor speakers/marquees; and
- redundant power for IT closets at the Centennial and Rampart campuses.

Fiscal Year 2018-19 Information Technology Request

Pikes Peak Community College *Campus Emergency Notification and Power*

PPCC plans to install emergency notification alert speakers, scrolling marquees, and flashers in hallways, open spaces, atriums, and common areas near buildings and parking lots on its three campuses: Rampart Range, Downtown Studio, and Centennial. PPCC states that it already alerts personnel and students via voice and text, but wants to ensure the system that is available during power outages and to expand its reach to areas without phones or desktops.

PROJECT JUSTIFICATION

PPCC states that during an independent review of PPCC's Emergency Operation plan in Spring 2016, reviewers found a critical gap in the college's emergency notification system, including the ability to display and broadcast alerts in common areas. Additionally, in June 2017, based on a recommendation from the Office of the State Architect, PPCC conducted an emergency power system analysis. This analysis noted a need for battery backup and redundant power. According to PPCC, this project will help the college further its goals by providing a safe and optimum learning environment for its students, including students with hearing and/or vision impairments.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

PPCC's IT staff will work with PPCC's Facilities and Campus Police to provide project support. According to PPCC, an electrical engineer and a bid-winning contractor will provide project design, construction documents, project improvements, equipment installation, and the implementation of required systems.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

PPCC was unable to quantify cost savings calculations as required by House Bill 15-1266, but states that the project will create a safer environment for students.

SECURITY AND BACKUP / DISASTER RECOVERY

CCCS provides IT security functions for PPCC. PPCC states that the project includes requests for backup battery power and power redundancy, which will help with both backup and disaster recovery requirements.

BUSINESS PROCESS ANALYSIS

According to PPCC, this project addresses a security gap identified by a CCCS-sponsored independent emergency review.

PROJECT SCHEDULE

	Start Date	Completion Date
Planning	July 2018	November 2018
Implementation	December 2018	December 2019
Equipment	January 2019	September 2019
Completion		March 2020

OPERATING BUDGET

Operating expenses are paid from institutional sources. According to PPCC, the college currently has a budget line item for ongoing costs for the systems and technologies in the project. PPCC expects a minimal increase in operating expenses as a result of this project.

Fiscal Year 2018-19 Information Technology Request

Pikes Peak Community College *Campus Emergency Notification and Power*

STAFF QUESTIONS AND ISSUES

1. Does PPCC collect student fees for technology? If so, could these fees be used to pay for this project?

Pikes Peak Community College does not collect a student technology fee.

2. Currently, how does the PPCC communicate with students, staff, and visitors during an emergency or adverse event?

PPCC's current system requires a number of different systems to provide an emergency alert, which is inefficient, creates delay, and is not full scale. Telephones with voice and text messages and display alerts on desktops provide notice where these devices are located, but does not provide alert in common areas, immediate perimeter of the campuses, nor parking lots. The Public Address (PA) system can provide emergency alert notice; however, the on-duty Officer must first be able to get to a specific office location at each campus to activate the system. It is important to note that the PA system at the Downtown Studio Campus is a stand-alone system; however, at both the Rampart Range Campus and the Centennial Campus, the PA system is directly tied to the fire alarm system. Permission by the respective fire department must be granted to override the fire alarm system and use the PA system for emergency alerts. Both of these alert systems are only audible alerts. Consequently, PPCC has no way of alerting hearing-impaired students, staff, and visitors. The proposed system would consolidate all the different systems into a single system that is capable of alerting simultaneously all PPCC on-campus constituents both audibly and visually.

3. What portions of this current request have been requested in prior fiscal years, if any?

In FY 2017-18, PPCC submitted a funding request from the Joint Technology Committee for campus emergency notification and power, which included two power generators and a transformer switch. At the time of the request, an emergency power system analysis had not yet been completed. For FY 2018-19, PPCC's current funding request is based on the recommendations from the completed emergency power system analysis that reduced the request to \$524,865. This reduction is a direct result of the emergency power system analysis, which identified key IT components needed to accomplish the project and further identified electrical power deficiencies that are being addressed in a controlled maintenance request.

Fiscal Year 2018-19 Information Technology Request

Community College of Denver

Storage and Virtualization

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-151

Approved Program Plan?

N/A

Date Approved:

Community College of Denver (CCD), as a part of the Colorado Community College System (CCCS), adheres to the system's IT policies and procedures.

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
CCHE	30 of 34	
OSPB	45 of 53	Not recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$1,005,344	\$0	\$0	\$1,005,344
CF	\$0	\$124,260	\$0	\$0	\$124,260
Total	\$0	\$1,129,604	\$0	\$0	\$1,129,604

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$1,026,913	\$0	\$0	\$1,026,913
Contingency	\$0	\$102,691	\$0	\$0	\$102,691
Software Acquisition	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$1,129,604	\$0	\$0	\$1,129,604

PROJECT STATUS

This is new, never before requested project.

PROJECT DESCRIPTION / SCOPE OF WORK

CCD is requesting state funds to upgrade its network storage and virtual desktop and sever infrastructure. CCD plans to:

- upgrade and/or replace network storage systems;
- implement storage encryption; and
- enable the ability to audit the access to files.

CCD states the project plans to purchase one isilon storage solution, one VxRail E-Series with NSX solution, 600 Samsung NC241-TS desktops, and one EMC DD2500 and Avamar Node for offsite storage. According to CCD, the

Fiscal Year 2018-19 Information Technology Request

Community College of Denver

Storage and Virtualization

current network storage system does not allow the transfer of files to external storage devices. The college states that this creates redundancy issues. This inability to transfer files hinders the performance of virtual desktop and server infrastructure because network storage is currently sharing hardware with virtual desktop and servers.

Cash funds. The cash funds spending authority portion of this request will come from current reserves.

PROJECT JUSTIFICATION

The college is currently unable to upgrade its systems to newer software because of the age of current systems. CCD states that this upgrade will allow the college to separate the file storage environment from the virtual desktop infrastructure, creating less downtime and better performance. According to CCD, current hardware limits the ability to leverage the cost savings associated with virtual desktops. The upgrades would allow CCD to integrate virtual desktop infrastructure with its current computer refresh cycle.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

CCD staff will be responsible for the implementation of the project.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

CCD estimates that the project will allow for a longer computer refresh cycle, resulting in an estimated \$25,000 in savings. Additionally, the addition of new virtual desktops will result in a savings of \$200,000 over four years. According to CCD, the project will also result in "soft savings", such as shorter login times, reduced delays, and increased staff productivity.

SECURITY AND BACKUP / DISASTER RECOVERY

CCD states that this project will provide the college with better security, backup, and disaster recovery by enabling the ability to move resources when a specific piece of hardware fails. The project also allows for additional backup and off-site storage.

BUSINESS PROCESS ANALYSIS

CCD states that this project will help IT staff and the college as a whole realize efficiencies in the areas of data storage, processing, and accessibility. According to CCD, increased reliability and ease of access to data will improve the work product of both staff and students.

PROJECT SCHEDULE

	Start Date	Completion Date
Planning	August 2018	November 2018
Implementation	October 2018	November 2018
Equipment	January 2019	March 2019
Completion		March 2019

OPERATING BUDGET

Operating expenses are paid from institutional sources. CCD expects a minimal increase in operating budget expense as a result of the project.

Fiscal Year 2018-19 Information Technology Request

Community College of Denver

Storage and Virtualization

STAFF QUESTIONS AND ISSUES

1. Does CCD collect student fees for technology? If so, could these fees be used to pay for this project?

No. CCD does not have a student technology fee and, at this time, does not intend to request students approve a technology fee. Because of its location on the Auraria campus, CCD already has the highest fees of any of the community colleges in the system. For this reason, CCD is reluctant to increase fees further with a technology fee.

2. What are the specific current performance and redundancy issues referenced in the narrative due to sharing hardware with virtual desk infrastructure and virtual server infrastructure?

The current infrastructure has no operational redundancy and, as a result, has suffered failure of local file storage, virtual servers, and virtual desktops for extended periods of time. Due to the complexity and expense of the existing system, a redundant infrastructure was not feasible. Adding additional redundancy continues to be cost prohibitive in the current environment. Performance is also an issue because of the complexity of the environment. There are poor response times on local servers, virtual workstations, and file storage because these systems are running at 85 percent disk utilization and are all running on a single storage array and server chassis. Improving the redundancy and scalability will also improve performance.

3. Is CCD requesting anything for this fiscal year that was requested or funded in a prior fiscal year?

No.

Fiscal Year 2018-19 Information Technology Request

Lamar Community College

Technology Infrastructure

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-152

Approved Program Plan?

Waived

Date Approved:

October 24, 2016

Lamar Community College (LCC), as part of the Colorado Community College System (CCCS), adheres to the system's IT policies and procedures

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
CCHE	32 of 34	
OSPB	46 of 53	Not recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$769,886	\$0	\$0	\$769,886
CF	\$0	\$15,000	\$0	\$0	\$15,000
Total	\$0	\$784,886	\$0	\$0	\$784,886

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$784,886	\$0	\$0	\$784,886
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0
Software Acquisition	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$784,886	\$0	\$0	\$784,886

PROJECT STATUS

This a new, never-before-requested project. However, components of this project were requested in FY 2017-18.

PROJECT DESCRIPTION / SCOPE OF WORK

LCC is requesting state funds to upgrade its technology infrastructure. Areas of improvement include:

- instructional technology;
- office and classroom computer systems;
- servers;
- internet protocol (IP) telephony devices; and
- digital signage.

Fiscal Year 2018-19 Information Technology Request

Lamar Community College

Technology Infrastructure

The project will replace or add multimedia and computer equipment in classrooms, along with updated telephones and digital signage. In addition, the project will replace servers and install battery backup power.

Funding. According to LCC, the request includes items that were not funded in its FY 2016-17 and FY 2017-18 budget requests. LCC does not charge a student technology fee and states that the college would need to charge an additional \$57 per credit hour which may be unacceptable for the students it serves. The cash funds spending authority portion of this request will come from current reserves.

PROJECT JUSTIFICATION

According to LCC, many of its IT systems are eight or more years old and do not support current technologies that improve productivity, data availability, or campus communications. LCC states that many of its computer systems are obsolete and performing poorly for today's instructional needs. LCC's IP telephony devices are unable to support current technologies and are not installed in all classrooms. LCC reports that existing digital signage is limited and requires manual loading, which makes it hard for the college to disseminate critical information and campus messages during emergencies.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

LCC IT staff will be responsible for the implementation of the project. Systems will be on an implementation schedule that minimizes impact to daily operations. Staff will work closely with vendors and contractors to ensure satisfactory installation.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

LCC was unable to quantify the cost savings as required by House Bill 15-1266, but states that college IT staff (1.5 FTE) would increase productivity because staff would spend less time troubleshooting and repairing obsolete equipment.

SECURITY AND BACKUP / DISASTER RECOVERY

CCCS provides IT security and backup services for LCC.

BUSINESS PROCESS ANALYSIS

LCC states that this project will help IT staff and the college as a whole realize efficiencies of existing operation through tools that allow for increased automation and availability of data access, management, and recovery.

PROJECT SCHEDULE

	Start Date	Completion Date
Planning	June 2018	July 2018
Implementation	August 2018	June 2019
Equipment	August 2018	May 2019
Completion		June 2019

Fiscal Year 2018-19 Information Technology Request

Lamar Community College

Technology Infrastructure

OPERATING BUDGET

Operating expenses are paid from institutional sources. LCC expects a minimal increase in operating expenses as a result of the project.

STAFF QUESTIONS AND ISSUES

All staff questions were incorporated into the analysis.

Fiscal Year 2018-19 Information Technology Request

Trinidad State Junior College

Technology Infrastructure

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-156

Approved Program Plan?

Date Approved:

Trinidad State Junior College (TSJC), as part of the Colorado Community College System (CCCS), adheres to the system's IT policies and procedures.

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
CCHE	33 of 34	
OSPB	48 of 53	Not recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$615,310	\$0	\$0	\$615,310
Total	\$0	\$615,310	\$0	\$0	\$615,310

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$25,000	\$0	\$0	\$25,000
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$562,200	\$0	\$0	\$562,200
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$28,110	\$0	\$0	\$28,110
Software Acquisition	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$615,310	\$0	\$0	\$615,310

PROJECT STATUS

This is a new, never-before-requested project.

PROJECT DESCRIPTION / SCOPE OF WORK

TSJC is requesting state funds to improve its instructional and academic support activities. The project includes updating the current surveillance and backup recovery systems, replacement of parts of network infrastructure, and upgrading computers. Additionally, the project plans to upgrade network switches, wireless networks, and disaster recovery systems. Project components include:

- servers;
- desktops, laptops, terminals, and personal digital assistants;
- printers, scanners, and peripherals;
- network equipment and cabling;
- software and memory upgrade to interface video surveillance cameras with door locks and expand memory

Fiscal Year 2018-19 Information Technology Request

Trinidad State Junior College

Technology Infrastructure

capacity for safety and reporting purposes; and

- instructional technology support, training, and electronic learning resources for high cost programs such as nursing and robotics.

PROJECT JUSTIFICATION

According to TSJC, a significant portion of the college's IT infrastructure is outdated or at risk of failure. TSJC states that their current surveillance system is unable to interface with the door lock system and is no longer supported by the manufacturer. TSJC also notes that most of the campus computers are unable to run the newest software updates. In addition, data backups still need to be run during the day which impacts performance and leads to a time consuming file restoration process. According to TSJC, all of this this leads to performance and network issues that impact network traffic for students and staff.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

TSJC IT staff, along with CCCS IT staff, will implement the project. TSJC plans on consulting vendors for support. TSJC states that the project will be conducted with minimal disruption to end users.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

TSJC was unable to quantify the cost savings as required by House Bill 15-1266, but states that the project will positively impact performance for all persons on campus. TSJC notes the project would lead to increased productivity because staff would spend less time troubleshooting and supporting obsolete equipment.

SECURITY AND BACKUP / DISASTER RECOVERY

TSJC states that one of the goals of the project is to replace or upgrade systems related to the preservation and security of data. CCCS does provide some IT security services for TSJC.

BUSINESS PROCESS ANALYSIS

Due to most of TSJC's technology infrastructure nearing the end of its useful life. TSJC states that this project will lead to increased reliability and access to data which will improve instructional learning and business processes for students and staff.

PROJECT SCHEDULE

	Start Date	Completion Date
Planning	January 2018	June 2018
Implementation	July 2018	June 2019
Equipment	July 2018	June 2019
Completion		June 2020

OPERATING BUDGET

Operating expenses are paid from institutional sources. TSJC does not expect an increase in operating expenses as a result of this project.

Fiscal Year 2018-19 Information Technology Request

Trinidad State Junior College

Technology Infrastructure

STAFF QUESTIONS AND ISSUES

1. Does TSJC collect student technology fees? If so, could these fees be used to pay for this project?

TSJC will collect approximately \$58,000 per academic year from a technology fee of \$2 per credit hour. This fee was implemented in FY 2017-18 to provide funding for the infrastructure of the institution, which may include server upgrades, computer upgrades, and wireless internet connectivity. Student fees cannot be utilized for administrative technology needs. TSJC would need to charge approximately \$20 per credit hour to fund this request through a technology fee.

2. Will TSJC be able to support the ongoing costs for the support and maintenance of the systems and technology discussed in the request within its existing operating budget?

Yes. The request is replacing the technology the college currently supports with institutional funds.

Fiscal Year 2018-19 Information Technology Request

Pueblo Community College

Security Intrusion Detection and Internal Door Access

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-155

Approved Program Plan?

Date Approved:

Pueblo Community College (PCC), as part of the Colorado Community College System (CCCS), adheres to the system's IT policies and procedures.

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
CCHE	34 of 34	
OSPB	48 of 53	Not recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$815,000	\$0	\$0	\$815,000
Total	\$0	\$815,000	\$0	\$0	\$815,000

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$65,000	\$0	\$0	\$65,000
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$600,000	\$0	\$0	\$600,000
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0
Software Acquisition	\$0	\$150,000	\$0	\$0	\$150,000
Total	\$0	\$815,000	\$0	\$0	\$815,000

PROJECT STATUS

This is a new, never-before-requested project.

PROJECT DESCRIPTION / SCOPE OF WORK

PCC is requesting state funds to enhance internal and perimeter security systems at its Pueblo, Fremont, and Mancos campuses. Areas of enhancement include:

- expansion of PCC's security camera system;
- software for integration between cameras and door access controls;
- additional server storage and processing;
- a controller system; and
- additional switch blades/cards for networking.

According to PCC, the goal of the project is to integrate and expand the existing surveillance systems with the

Fiscal Year 2018-19 Information Technology Request

Pueblo Community College

Security Intrusion Detection and Internal Door Access

building door access system. This will allow campus police to secure access to buildings around campus during emergencies.

Funding history. As recommended by the Capital Development Committee, PCC received \$913,208 in FY 2016-17 and \$962,550 in FY 2017-18 in controlled maintenance funding for security upgrades at all three of its campuses. The funding was for a two-phase project to replace all 30-year-old mechanical door locks with an electronic locking system in order to improve security on the Pueblo, Fremont, and Mancos campuses.

PROJECT JUSTIFICATION

PCC states that legacy intrusion systems are only partially functional. With these systems at the end of their functional life, there is limited support available. The new systems will be able to automatically process notifications and collect video/audio data at the location of a security breach, providing better safety outcomes for staff, students, and visitors to the campuses. According to PCC, the new systems will mitigate and eliminate safety risks to persons on campus by allowing safety personnel to have better access to information and communicate during emergencies.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

PCC's IT and public safety staff have significant experience with these systems and will work with vendors and consultants to implement the project.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

PCC states that there will be a direct cost savings that has not be quantified from the elimination of current operating contracts for intrusion alerting systems. PCC notes that the project is an important part of creating a safe environment for the entire campus population during an emergency by giving safety personnel better and more effective tools.

SECURITY AND BACKUP / DISASTER RECOVERY

PCC states that all database and associated electronic systems are backed up on a regular basis. CCCS provides some backup, security, and disaster recovery for PCC.

BUSINESS PROCESS ANALYSIS

PCC states that the project will be integrated into routine drills for lock downs, lockouts, and associated emergencies across all campus locations. According to PCC, this request allow the college to more effectively manage security incidents with limited staff in an efficient manner without placing personnel in danger.

PROJECT SCHEDULE

	Start Date	Completion Date
Planning	July 2018	September 2018
Implementation	October 2018	November 2018
Equipment	February 2019	March 2019
Completion		April 2019

Fiscal Year 2018-19 Information Technology Request

Pueblo Community College

Security Intrusion Detection and Internal Door Access

OPERATING BUDGET

Operational expenses are paid from institutional sources. PCC expects minimal operating expenses as a result of the project.

STAFF QUESTIONS AND ISSUES

1. Does PCC collect student safety or technology fees? If so, could these fees be used to pay for this project?

Currently, PCC is not collecting a safety or technology fee. However, a technology fee of \$10 per credit hour was voted on by the students and will start being collected in the fall semester, 2018. These fees though were stipulated for use for the upgrade and replacement of any technology supporting the technology infrastructure relating to the education of students. PCC would need to charge approximately \$40 per credit hour to fund this request through a fee.

2. Please describe PCC's internal building and perimeter security systems.

The current security systems the college has are obsolete and at end of life.

The camera system hosts a combination of digital and analog cameras that are situated to monitor and record entrances and exits to most of the building entrance and exit doors, as well as primary corridors in most buildings. These systems are in place for all campus locations. The file servers hosting the application software and disk storage as well as the camera control software for the Pueblo and Fremont campus locations are currently at capacity and maintain video footage for approximately 45 days. At this time, the college has capacity (CPU / Disk Storage) to record video at 8 frames per second (fps). For proper security, the college will need to be able to double this capacity to 15 fps and in places to move to 30 fps, such as parking lot entrances and high capacity doorways. There are many areas in the college's buildings that do not have adequate camera coverage and need the additional cameras and corresponding server capacity/disk storage.

The video/security system that is in place for the Cortez facility is past end of life and support. When cameras fail, the college is removing them from the system leaving areas of the campus with no surveillance capability. When the central system finally fails (it can no longer be repaired, patched, or maintained), the campus will be in a position of having no surveillance system.

There are 350 cameras in place for Pueblo and Fremont, 271 of which are at end of life and support and need to be replaced. Over half of these cameras have poor picture quality and are not reliable.

The current intrusion systems for the college's buildings are obsolete and have limited functionality. The alerting for intrusion from doors, if forced entry occurs, is largely non-functional and cannot be repaired without replacing systems. New passcodes to arm the building intrusion systems are not capable of being assigned for most of the buildings.

Who currently has access to this system?

- *Campus police are the primary users of the system with access to play, review, and retrieve access to video storage across all cameras.*
- *Testing center proctors have access to view video from the cameras that are located in testing centers (only).*

What are your current access / security protocols?

- *Access to the systems is provided to individuals when requested by either the Campus Chief of Police or by the Chief Business Officer. Access is granted only for specific areas and requires a need to know before access is allowed.*

Who has access to security video footage?

Fiscal Year 2018-19 Information Technology Request

Pueblo Community College

Security Intrusion Detection and Internal Door Access

- *Only campus police officers have security/authority to pull security footage when needed for case evidence.*

3. What portions of this current request have been requested in prior years, if any?

No portions have been requested in prior years.

Fiscal Year 2018-19 Information Technology Request

Otero Junior College

Technology and Communications Upgrades

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-153

Approved Program Plan?

Waived

Date Approved:

October 24, 2016

Otero Junior College (OJC), as part of the Colorado Community College System (CCCS), adheres to the system's IT policies and procedures.

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
CCHE	34 of 34	
OSPB	49 of 53	Not recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$543,300	\$0	\$0	\$543,300
Total	\$0	\$543,300	\$0	\$0	\$543,300

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$0	\$0	\$0	\$0
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$543,300	\$0	\$0	\$543,300
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0
Software Acquisition	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$543,300	\$0	\$0	\$543,300

PROJECT STATUS

This is a new, never-before-requested project. However, components of this project were requested for FY 2017-18.

PROJECT DESCRIPTION / SCOPE OF WORK

OJC is requesting state funds to upgrade its technology communication infrastructure. Improvements include:

- replacing all telephone headsets;
- installing telephones in all classrooms;
- adding video and audio instruction products to classrooms; and
- utilizing a digital signage directory system.

OJC states that these upgrades will help provide effective campus instruction and communication.

Fiscal Year 2018-19 Information Technology Request

Otero Junior College

Technology and Communications Upgrades

PROJECT JUSTIFICATION

According to OJC, the campus' current telephones are over seven years old and do not support current technologies for robust communication. OJC plans to install backup power supply units to allow for uninterrupted service during power outages. According to OJC, improved access to virtual desktop infrastructure will enable better staff decisions and instruction. OJC notes that all improvements will enhance OJC's ability to inform the campus with fast and accurate information during an emergency.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

OJC IT staff, along with CCCS IT staff, will be responsible for the implementation of this project. OJC states that staff will work closely with vendors for consultation and installation support. In addition, OJC will educate staff and students on the new technology upgrades.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

OJC states that there will be no direct cost savings associated with this project. However, OJC notes that the project is an important part of creating a safe environment for the entire campus population during an emergency.

SECURITY AND BACKUP / DISASTER RECOVERY

OJC states that funding in FY 2015-15 and FY 2016-17 allowed OJC to purchase state of the art security and backup equipment. CCCS does provide some backup, security, and disaster recovery for OJC, and the college is implementing an off-site disaster recovery project with a private vendor.

BUSINESS PROCESS ANALYSIS

OJC states that this project will help mitigate adverse consequences, such as an emergency event on campus, through tools that allow for increased communication.

PROJECT SCHEDULE

	Start Date	Completion Date
Planning	July 2018	September 2018
Implementation	October 2018	November 2018
Equipment	February 2019	March 2019
Completion	April 2019	March 2019

OPERATING BUDGET

Operating expenses are paid from institutional sources. OJC expects a minimal increase and costs can be paid for within existing resources.

STAFF QUESTIONS AND ISSUES

1. Does OJC collect student fees for technology? If so, could fees be used to pay for this project?

Otero Junior College began a \$4 per credit hour technology fee in the fall semester, 2017. This fee is expected to generate approximately \$75,000 annually. These funds are to be used to pay for internet service provider fees

Fiscal Year 2018-19 Information Technology Request

Otero Junior College

Technology and Communications Upgrades

and bandwidth charges as well as upgrades and maintenance of the wireless audio and video communication system for approximately 1,500 users, the majority of which are students including 350 students who reside in dormitory facilities. Technology is a vital communication method for students that assists with learning in the classroom as well as accessibility throughout the OJC Campus to keep students and staff informed of current events and provide direction in circumstances that may require specific processes to be followed. The technology fee was not structured nor is it adequate to be used for purchase of new or additional equipment on a large scale. OJC would need to charge approximately \$16 per credit hour to fund this request through a technology fee.

2. What portions of this current request have been requested in prior fiscal years, if any?

Otero Junior College has requested technology equipment similar to these requests in prior years and fortunately has been the recipient of funding for these past requests. However, with the rapid improvements and advances in technology, it is of the utmost importance that the college can continue to provide the most current technology. In order for the college not to be limited in what it can effectively offer students and staff in learning and teaching opportunities, it must have the necessary, up to date technology to convey cutting edge educational methods and materials. It is imperative the college has the financial support for technological equipment and software to provide these opportunities. Legislative support will greatly assist the college in achieving this portion of its mission.

Otero Junior College Mission Statement: "To provide quality higher education that is **accessible**, transforms lives, expands employment opportunities, enriches our communities, promotes individual and global culture diversity and fosters economic development"

Fiscal Year 2018-19 Information Technology Request

Natural Resources — Parks and Wildlife

Law Enforcement Records Management System

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-150

Approved Program Plan?

N/A

Date Approved:

Colorado Parks and Wildlife (CPW) says the project has gone through the initial stages of the intake process with the Governor's Office of Information Technology (OIT) and CPW will continue to work with OIT as a partner on the project. The project is prioritized on the department's five-year roadmap.

PRIORITY NUMBERS

Prioritized By

Priority

DeptInst

1 of 1

OSPB

N/A of 7

Recommended for funding from cash sources.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CF	\$0	\$2,523,326	\$0	\$0	\$2,523,326
Total	\$0	\$2,523,326	\$0	\$0	\$2,523,326

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$1,007,268	\$0	\$0	\$1,007,268
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$120,158	\$0	\$0	\$120,158
Software Acquisition	\$0	\$1,395,900	\$0	\$0	\$1,395,900
Total	\$0	\$2,523,326	\$0	\$0	\$2,523,326

PROJECT STATUS

This is a new, never-before-requested project.

PROJECT DESCRIPTION / SCOPE OF WORK

CPW is requesting cash funds spending authority to replace its two existing law enforcement records systems with a single records management system, known as RAMS. The new RAMS system will be used by CPW officers, staff, and management to input, access, and report data related to case reports, incidents, citations, accident logs, evidence management, and officer training records. The new system will be acquired as either a commercial off-the-shelf (COTS) system or as a Software as a Service (SaaS) system. To help implement the project, CPW plans to hire a term-limited project manager from OIT to coordinate the IT-related activities with CPW and the vendor.

CPW says RAMS will improve existing functions such as creating case reports, controlling system access and administration, logging payments, tracking cases through the court system, and reporting on citations. RAMS will also add new capabilities, including enhanced field access. For example, CPW officers will be able to use mobile technology to collect citation information, photos, and videos. CPW officers will also be able to search data in the

Fiscal Year 2018-19 Information Technology Request

Natural Resources — Parks and Wildlife

Law Enforcement Records Management System

system (e.g., outstanding violations) from the field.

Cash funds. The source of cash funds is the Parks and Outdoor Recreation Cash Fund (\$1,619,857; 64.2 percent) and the Wildlife Cash Fund (\$903,469; 35.8 percent).

PROJECT JUSTIFICATION

CPW says its two existing law enforcement records systems, the Violation Management System (VMS) and the Law Enforcement Citation System (LECS), are outdated and not able to share data or interface with each other.

According to CPW, both systems have technical deficiencies and distinct operational differences. VMS is 15 years old and is primarily used by CPW wildlife officers to track hunting and fishing citations. LECS is ten years old and is primarily used by CPW park officers for citations and case trackings. Both web-based systems were developed independently of each other prior to the merging of the Division of Parks and Outdoor Recreation and the Division of Wildlife in 2011.

The new RAMS system will include all of the existing functionality of VMS and LECS. CPW says it will also: (1) improve and standardize management practices; (2) allow CPW to comply with both Peace Officer Standards and Training and statutory reporting requirements; (3) provide an integrated records management solution for all of CPW; and (4) modernize CPW's ability to work with its customers (e.g., permitting online payments for citations). Additionally, CPW says maintenance for the new vendor-supported system will be improved. It will also be configured for easier data access, tracking, and reporting, and integrate with geographic information system (GIS) data. Finally, RAMS will be configured to interact with other law enforcement databases and will allow for easier sealing of records and collection of information for Colorado Open Records Act requests.

CPW says support for VMS and LECS is phasing out, as the software platforms no longer receive vendor support and the systems are incompatible with commonly used software and hardware. Continued use of VMS and LECS will put system functionality, security, and uptime to at risk. Furthermore, neither system has been updated to respond to recent changes in law enforcement practices and reporting requirements. Upgrading to a vendor-hosted or COTS system allows new modules to be implemented as they are developed.

Project alternatives. If the systems are not replaced, CPW says VMS and LECS will remain operational, but it will become more difficult to troubleshoot problems as the systems age. Additionally, the manual processes and system workarounds currently required will continue to consume staff resources that could be directed towards supporting other law enforcement activities. A new system will allow CPW to deliver enhanced customer service by ensuring more accurate and timely reporting of wildlife and parks-related incidents. Without a new system, the risk of reduced functionality or system failure will continue to increase each year. CPW also considered updating VMS and LECS, but determined that neither can be updated since they are both built on obsolete system architectures. Finally, CPW considered developing a new system in-house. While an in-house system could allow for greater flexibility in the system design, CPW says that neither it nor OIT have sufficient resources to devote towards a project of this size.

System costs. System costs are estimated based on CPW's analysis of a similar system implemented by the Minnesota Department of Natural Resources in 2012 and adjusted for inflation.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

Program information. In 2016, CPW commissioned 224 full-time wildlife officers and 129 full-time parks officers. The number of wildlife citations averages about 5,800 per year and parks citations average about 6,000 per year. Examples of wildlife citations include hunting and fishing violations. Examples of parks citations include boating and traffic violations.

Implementation plan. CPW plans to work with a vendor to adapt and integrate the new system. At the same time, CPW will review and improve upon its internal processes and procedures in order to fully leverage the new software's capabilities. See Project Schedule for more information.

Fiscal Year 2018-19 Information Technology Request

Natural Resources — Parks and Wildlife

Law Enforcement Records Management System

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

CPW believes the project will result in about 3,500 hours of savings in staff time per year.

SECURITY AND BACKUP / DISASTER RECOVERY

CPW says the new law enforcement system will be categorized as mission critical and high priority. Security will be critical since RAMS will house personal information and sensitive law enforcement information. The disaster recovery plan for the new system will ensure data recovery in case of system failure. An acceptable level of risk will be determined during project procurement to ensure the new system meets CPW's needs.

BUSINESS PROCESS ANALYSIS

CPW says that VMS and LECS do not support the business operations of the consolidated CPW law enforcement program. In addition to standardizing law enforcement activities across CPW, implementation of a new and unified law enforcement system provides an opportunity to improve processes in light of expanded system capabilities. For example, the process of collecting and logging evidence are different for LECS and VMS. These processes and others will be reviewed and standard processes will be developed for all CPW officers.

PROJECT SCHEDULE

	Start Date	Completion Date
RFI/RFP Process	September 2017	June 2018
Planning and Design	July 2018	January 2019
Execution	January 2019	January 2020
Completion	January 2020	June 2020

OPERATING BUDGET

CPW expects on-going costs for the new system to be \$205,000 per year for vendor support, software updates, and custom configurations (e.g., for unique reporting and interface requirements).

STAFF QUESTIONS AND ISSUES

1. Did CPW consider any other options besides a COTS or SaaS solution for the project (e.g., customized program, etc.)? If so, please explain. If not, why were the COTS/SaaS solutions chosen as the preferred options? Please explain any other alternatives that were considered and the cost differences between them.

Colorado Parks and Wildlife considered a completely customized application – that is, developed from scratch – to meet the agency's law enforcement records management needs. However, it quickly became evident that this option had several challenges that would be very difficult to overcome. A fully customized solution would require a major allocation of resources by both CPW and OIT, would involve an extended development schedule, and would likely prove to be cost-prohibitive. CPW Law Enforcement staff are in frequent contact with other natural resource law enforcement agencies, as well as other law enforcement agencies within Colorado; through these contacts CPW staff heard anecdotally about COTS systems that work well for other law enforcement agencies. After further research, a COTS system emerged as CPW's preferred option; there are known COTS products available that appear to meet CPW's requirements and system capabilities and fall within the agency's estimated budget for the project.

2. The narrative mentions a similar project undertaken by Minnesota. Did CPW research any other states' solutions for similar projects? If so, please explain the cost differences between states.

Fiscal Year 2018-19 Information Technology Request

Natural Resources — Parks and Wildlife

Law Enforcement Records Management System

CPW's main point of interest while formulating the proposed project request was in finding a product to meet the agency's own internal needs. CPW Law Enforcement staff have had informal communications with other states about their record management systems, but no comprehensive nationwide search/information request was made to other states regarding their current software products and their initial and/or operating costs.

3. How does CPW intend to pay for the \$225,000 in annual operating costs?

Should this project be approved, CPW estimates a project roll-out sometime in early 2020. Assuming this timetable is met, the agency could require spending authority to cover half of one fiscal year's estimated operating costs in FY 2020-21 (about \$112,500), and spending authority to cover the full annual operating costs beginning in FY 2021-22. CPW anticipates submitting an FY 2020-21 decision item requesting increased spending authority to cover these costs, assuming that the project has proceeded on schedule and has gone live. Funding will be a mix of wildlife cash (from the Wildlife Cash Fund) and state parks cash (from the State Parks Cash Fund).

4. What are the current annual operating costs for the VMS and LECS systems?

CPW currently pays about \$16,800 annually (\$1,400 per month) to support the LECS system. These costs cover server hosting and product support. VMS support is provided by OIT and is covered by common policy costs. CPW cannot quantify annual costs specific to the VMS system.

5. The narrative states that CPW recently issued an RFI for the project. Has CPW received responses to the RFI?

CPW issued a request for information (RFI) in September 2017 and received information from seven vendors. Information from the RFI responses will be used to develop the final RFP issued by CPW.

6. House Bill 15-1266 requires all information technology budget requests to identify and quantify anticipated administrative and operating efficiencies or program enhancements and service expansion through cost-benefit analyses and return-on-investment calculations. Has CPW identified or quantified any of these potential benefits? If so, please provide the additional information. If not, please explain why.

A records management system is fundamental to CPW's law enforcement activities and facilitates most of the agency's day-to-day law enforcement operations, including incident reporting, citation management, evidence tracking, and compliance with state and federal requirements. While cost-benefit analyses are an important tool, to a great extent, the decision to move to a modern, streamlined law enforcement records management system is a management (as opposed to financial) decision by CPW that recognizes the pivotal role that such a system plays. The decision also considered the time-sensitive nature of this request, coupled with the many benefits that are difficult to quantify (e.g., increased data integrity and reliability, reduced liability, and maintaining and improving public perception of CPW).

With this background, CPW has performed a five-year cost benefit analysis that identifies the benefits of the system and, when quantifiable, estimates benefits in terms of dollar value and/or reductions to the workload of current staff. In total, the system's capabilities are expected to offset about 3,500 hours of staff time from CPW law enforcement and administrative staff. The reduction in time is distributed over many staff (CPW has about 350 law enforcement officers, and administration attributable to law enforcement activity is performed by many additional staff agency-wide) and stems primarily from streamlined workflow, eliminated redundancies, and improved system functionality. Time saved across these positions will be applied to mission-oriented activities including customer service. Annually, the time saved is equivalent to \$144,000 of benefits.

One important benefit that is not quantified in CPW's analysis is the benefit of not having an outdated, unsupported law enforcement system. Both the LECS and VMS systems are already beyond their useful life and use out-of-date technology and system architectures. The software platforms used by LECS and VMS are no longer supported by vendors, and the Office of Information Technology is phasing out support for these systems. Ongoing use of VMS and LECS will place CPW in a vulnerable position as functionality, security, and system up-time are increasingly at risk.

The Colorado Parks and Wildlife budget for all law enforcement activities in fiscal year 2016-17 was about \$9.8

Fiscal Year 2018-19 Information Technology Request

Natural Resources — Parks and Wildlife

Law Enforcement Records Management System

million, and in fiscal year 2017-18 is about \$9.5 million. Estimated costs for fiscal year 2018-19 could be about \$10.0 million, given recent personal services-related increases. These budget figures include salaries, benefits, and operating costs. A catastrophic failure of the agency's two existing systems would impact law enforcement operations at every level at which they are conducted, including law enforcement staff in the field, supervisory staff overseeing field staff, administrative staff, and management.

If the current system were to crash, the Division would have to convert to a paper record system. A paper-based system would be inefficient in that: (1) it would require far more time-consuming paper records management; (2) more copies would need to be made so that various staff involved would have information on cases; (3) there would be a risk that files would be lost (which would risk the State not being able to successfully enforcement violations), and; (4) some paper or other alternatives such as Excel-based records would be needed for accounting and tracking of penalties and fines, etc. CPW cannot accurately quantify the loss of efficiency and loss of productivity that will result from a hard crash of the agency's system. However, it does not seem unreasonable to think that law enforcement activities will become five to ten percent less efficient if they are not supported by a law enforcement management system to assist in managing records, tracking evidence, providing schedule reminders, providing reporting and search functions, etc. A productivity loss of five to ten percent to a law enforcement budget of \$10.0 million would result in losses between \$500,000 to \$1.0 million. Given these possible losses in productivity if the current law enforcement systems crashes, CPW believes that the benefits of the proposed new system will pay for the cost of the new system within two to four years.

Fiscal Year 2018-19 Information Technology Request

Human Services

Interoperability

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2016-013

Approved Program Plan?

N/A

Date Approved:

The Governor's Office of Information Technology (OIT) was an active participant in writing the planning grant for the project. The implementation of the project will be accomplished in cooperation with OIT and will align with its enterprise health IT architecture model.

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
OSPB	1 of 7	Recommended for funding

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$3,139,298	\$50,000	\$2,072,376	\$0	\$5,261,674
FF	\$28,253,682	\$450,000	\$18,651,384	\$0	\$47,355,066
Total	\$31,392,980	\$500,000	\$20,723,760	\$0	\$52,616,740

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$11,422,480	\$500,000	\$9,553,760	\$0	\$21,476,240
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$12,600,000	\$0	\$6,600,000	\$0	\$19,200,000
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0
Software Acquisition	\$7,370,500	\$0	\$4,570,000	\$0	\$11,940,500
Total	\$31,392,980	\$500,000	\$20,723,760	\$0	\$52,616,740

PROJECT STATUS

This is a continuation project. To date, the department has encumbered \$1,061,261 and spent \$254,054 on the project.

PROJECT DESCRIPTION / SCOPE OF WORK

The Department of Human Services (DHS) is requesting a combination of state funds and federal funds spending authority for the fourth phase of a five-phase project to create an interoperable environment for the department's IT systems. Interoperability is defined as the ability of two or more systems or applications to exchange information. The department says this shared information environment will provide better coordinated services to improve the lives of children, youth, and families in Colorado.

According to the department, this project will add the interoperability standards and framework that provide access to data contained within various systems without removing the data from these systems. These standards and framework include the necessary technical components, security, and governance for interoperability. Specifically,

Fiscal Year 2018-19 Information Technology Request

Human Services

Interoperability

this does not remove or eliminate current data, but does reduce the need to build and maintain custom data interfaces between systems.

Federal match. The department expects a continuation of a 90/10 percent match funding model under an exemption to the cost allocation requirements set forth in the federal Office of Management and Budget Circular A-87, which expires in December 2018. The federal program requires states to pay their share of the costs associated with building state-based information technology systems. This funding model allows federally-funded human services programs to benefit from investments in the design and development of state eligibility determination systems for state-operated exchanges, Medicaid, and the Children's Health Insurance Program (CHIP). DHS says that this funding model will apply to implementing and maintaining an interoperability environment. The federal funds will be secured through submission to the Centers for Medicare and Medicaid Services (CMS). A requirement for federal approval is demonstrating that the state has committed its 10 percent funding match.

PROJECT JUSTIFICATION

According to the department, its IT systems are diverse, requiring hundreds of unique interfaces that manage data about the programs, services, clients, and finances for 95 different federal, state, and county IT systems. Without this project, the department says that the systems will remain disconnected or continue to transfer data using disparate legacy technical interfaces. This project will implement new standards, find common applications, and improve organization processes according to best practices.

This project will implement a service-oriented architecture (SOA) using a connected enterprise service bus (ESB). SOA provides the ability for applications to leverage technical services using a standard protocol. An ESB provides a single, unified technical platform that manages access to different applications using a consistent communication mechanism. The department explains that the interoperability strategy provides a roadmap for improved business processes and program performance throughout the entire organization.

Project alternatives. The department says that if state funding for the 10 percent match is not received in FY 2018-19, the project cannot continue as planned. If that occurs, DHS says it will continue to support disparate, legacy technical interfaces, which impedes the integration of services and further cost reductions. Also, the department's security risk for handling sensitive personal, health, and financial data increases by continuing to use over 500 different code interfaces. After conducting market research, DHS states that it currently does not have the funding to maintain the 500 separate existing interfaces.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

Program information. The department collaborates with partners in state and county governments, nonprofits, and other organizations to design and deliver high-quality human and health services that improve the safety, independence, and well-being of Colorado citizens. Specifically, the department assists children at risk of abuse or neglect and Colorado families who need food, monetary, or energy assistance, as well as safe and affordable childcare.

Implementation plan. Through a federal grant, DHS created an interoperability roadmap plan to implement a sustainable, strategic pathway to connect the department's IT systems that uses a phased approach consisting of multiple work streams. DHS explains that the CMS federal approval process requires that the department submit an Advance Planning Document (APD). CMS asked Colorado to split the APD request into two documents for federal approval: (1) Planning Advance Planning Document (P-APD); and (2) Implementation Advance Planning Document (I-APD). The P-APD was approved in February 2016. Originally, the department estimated it would obtain CMS I-APD approval by June 2017. However, due to project complexity, the department now plans to obtain approval for the I-APD by January 2018.

Supporting documents submitted to CMS include Colorado interagency agreements, request for proposals, contracts, and other financial documents. After submission, CMS has 60 days to respond. If CMS responds with additional questions, the 60-day period resets after the department submits responses. DHS says one of the most important criteria CMS uses is the department's demonstration of Medicare and Medicaid interoperability.

Fiscal Year 2018-19 Information Technology Request

Human Services

Interoperability

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

DHS says that full implementation of the project would eliminate the costs of building and maintaining custom interfaces. The department lists 521 existing interface protocols across 10 protocol categories, such as Infomover and Manual. DHS says that over a five-year period, the department could potentially save \$12.1 million from the replacement of these two interface protocol categories. The department plans to track and validate these savings during the first year of project implementation.

SECURITY AND BACKUP / DISASTER RECOVERY

DHS says that all contracts for the project will include IT security language and that implementation will comply with the state's cybersecurity policies, which largely follow the National Institute of Standards and Technology (NIST) framework. The department says that disaster recovery and business continuity are largely managed at the individual system-level; however, the project will focus on overall connectivity and redundancy between various components.

BUSINESS PROCESS ANALYSIS

DHS says it will use the interoperability roadmap in a phased approach using multiple work streams. The department says that project stakeholders were extensively engaged in the interoperability planning and will also be involved in interoperability implementation. Stakeholders include the Governor's Health IT Coordinator and representatives from the Department of Health Care Policy and Financing, OIT, and the Department of Public Health and Environment. This group meets regularly as the Health Information Technology Workgroup. Other stakeholders include the Department of Education through ongoing data sharing efforts, and the Department of Public Safety.

PROJECT SCHEDULE

	Start Date	Completion Date
Governance and Stakeholder Engagement	July 2015	Ongoing
Additional Planning for CMS	July 2015	January 2018
Metadata Repository Implementation	July 2015	March 2018
Password Management	December 2017	May 2018
Identity Management and Security	July 2018	December 2018
Enterprise Service Bus	July 2016	Ongoing
Consumer Portal	February 2018	December 2019
Final Project Completion		June 2022

OPERATING BUDGET

The department does not plan to submit a FY 2018-19 operating budget request for the project. After the project's five-year development and implementation period, the department says an operating request to fund support and maintenance will be submitted with a federal-state match (75 percent federal funds and 25 percent state funds).

STAFF QUESTIONS AND ISSUES

See attached.

Colorado Department of Human Services (CDHS) IT Capital Construction
Interoperability

Joint Technology Committee (JTC) Staff Questions

The questions below reference the department's FY 2018-19, FY 2017-18, and FY 2016-17 budget requests for this project.

1. Has the department received any further guidance from CMS or any other federal agencies regarding federal funding for this type of project? Please include details.

The federal government continues to promote Interoperability and publish guidance documents. The Office of the National Coordinator (ONC) hosts the [HealthIT.gov](https://www.healthit.gov) web site which provides content such as [Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap](#) and the [Proposed Interoperability Standards Measurement Framework](#) as resources to guide and support interoperability system development. While CMS has not provided specific guidance to Colorado, they continue to advise that Interoperability projects that demonstrate a benefit to Medicaid eligibility and enrollment qualify for 90/10 funding for design development and implementation.

2. According to the FY 2017-18 budget request, the department says that the federal funding model allows federally-funded human services programs to benefit from investments in the design and development of state eligibility determination systems for state-operated exchanges, Medicaid, and the Children's Health Insurance Program (CHIP). Since last year's request, have federal requirements for Medicaid and CHIP changed? Based on federal requirements, please list any known risks or issues that would impact the federal match for this project. If applicable, please include a description and details of the risk or issue.

The federal government encouraged states to develop interoperable data systems leading up to and following implementation of the Affordable Care Act. Specifically, this took the form of the OMB Circular A-87 Cost Allocation Waiver issued in 2011 and later extended through December 2018. The waiver allowed states to invest in technology solutions with CMS paying 90% and without the need to cost allocate to other federal program beneficiaries.

At this time, it is unknown whether the federal government will extend the OMB A-87 Cost Allocation Waiver beyond December 2018. In the event the waiver is not extended, the Department is working with the Department of Health Care Policy and Financing to determine alternative funding approaches, including allocating the federal portions across funding for programs with systems impacted by interoperability. A list of programs and systems that will benefit from interoperability is included in response to question 8 below.

3. According to the current FY 2018-19 budget request on page CC-IT-01-8, the project completion is planned for June 2022. According to the FY 2016-17 and FY 2017-18 budget requests, project completion was planned for June 2020. The department explains in the FY 2018-19 budget request that due to CMS's additional planning requirement and the slow progress of multi-agency review and approval procedures, the project's funding expenditure is slower than originally planned.

- a. Besides the approval period for the P-APD and the I-APD, did the Department experience any other delays to explain the two-year delay? Please explain.

The Department encountered unexpected delays in procurement and contracting for the technical assessment and privacy and security consulting services required to complete the IAPD. Delays are primarily due to the complexity of the deliverables and the need to ensure that stakeholder groups had input into the planning phases and contract deliverables. Stakeholder and contractor groups include: three state agencies (the Departments of Human Services, Health Care Policy and Financing, and the Office of Information Technology), Colorado counties, Deloitte, and Alpha Consulting Group (ACG). Additionally all work product, including contracts required significant legal review. The timelines outlining key events in procuring the technical assessment and privacy and security consultants are included below.

Task	Technical Assessment	Privacy & Security Consultant
Start Requirements Gathering	09/12/2016	09/12/2016
Requirements Complete	10/21/2016	10/21/2016
Posted RFP	12/02/2016	11/02/2016
Closed RFP	01/21/2017	12/08/2016
Awarded Contract	03/13/2017	1/23/2017
Contract Executed	07/06/2017	08/11/2017

- b. Please list any known risks that would further impact the project schedule.

The primary risk is uncertainty around federal funding after December 2018 when the OMB A-87 Federal Cost Allocation Waiver expires. If the waiver is not extended, it will be necessary to obtain approval from additional federal partners to cost share some of the build as well as ongoing operations and maintenance.

4. Please list all entities that have systems that will benefit from this project's interoperability initiatives, including state and federal agencies. Please list the names of the systems, if possible.

The initial scope of the project is to connect systems in order to provide a benefit to Medicaid. For example, if the state can more efficiently ensure that Medicaid recipients who are eligible for food assistance can and do access nutritional food, health care costs for conditions like diabetes could be reduced.

The principal systems targeted for interoperability support programs within CDHS and HCPF. This system will also provide an enterprise platform that could be extensible to other state agencies, counties, Health Information Exchanges, etc. Table 1 illustrates the systems that will benefit from interoperability initiatives.

Table 1: Interoperability System Benefits

Federal / State Program	State Agency	System	Federal Agency
Medicaid	HCPF	*CBMS	*CMS
Child Health Insurance Programs	HCPF	*CBMS	*CMS
Supplemental Nutrition Assistance Program	CDHS	*CBMS	*FNS
Child Welfare	CDHS	Trails	*ACF
Youth Services	CDHS	Trails	*ACF
Colorado Child Care Assistance Program	CDHS	Trails/Colorado Shines/CHATS	*ACF
Community Behavioral Health	CDHS	Data Integration Initiative	*SAMHSA

*ACF: Administration for Children and Families

*CBMS: Colorado Benefits Management System

*CMS: Centers for Medicare & Medicaid Services

*FNS: Food and Nutrition Service

*SAMHSA: Substance Abuse and Mental Health Services Administration

- According to the FY 2018-19 budget request on page CC-IT-01-8, "if funding from the state for the 10 percent of the 90/10 match is not received in FY 2018-19, then there will be no federal match and the project will be terminated without achieving the stated objectives". According to page CC-IT-01-9, the balance of the 90/10 funding match to develop and implement interoperability will be approved after the I-APD is approved.

Please provide the reason and supporting details for why the project would terminate due to the state not appropriating additional funding for the FY 2018-19 budget request. If applicable, please include source(s) of information and any references.

The Office of Management and Budget (OMB) A-87 Cost Allocation waiver which allows projects such as interoperability to be funded using 90% federal funds from the Centers for Medicaid and Medicare Services (CMS) so long as states provide a 10% funding match approval. The continuing allocation of the 10% State share required to request the 90% match demonstrates the State's commitment to Interoperability. CMS will not approve the funding for implementation unless the State demonstrates the ability to provide the 10% match to the 90% federal funding. If the Department moves forward with CMS on an implementation request, it is possible that CMS would determine that the State does not have sufficient matching funds to complete the project and therefore, would not approve further implementation of the project.

- In the department's FY 2017-18 budget request on page IT-01-16, the department says that the following would be completed by June 2017: (1) complete CMS required additional planning; (2) implement metadata repository; (3) implement identity management, security, enterprise service bus; and (4) implement professional consumer portal.

Please provide the project's updated milestone schedule, including updated dates for the milestones listed in the schedule provided in the FY 2017-18 budget request. If possible, please update this schedule by grouping milestones into the phases, such as the planning phase, execution phase, testing phase and implementation phase.

a) *Complete CMS required additional planning.*

The Department plans to complete and submit the IAPD to CMS by January 2018.

b) *Implement metadata repository.*

OIT maintains an Application Lifecycle Management (ALM) system. ALM is in production and includes meta data about applications, including data about application interfaces which will be used during the technical implementation of the interoperability project. A Data Architect and Solution Architect have recently been hired to the project to complete this work within the expected timeline for a final response on the IAPD submission.

c) *Implement identity management, security, enterprise service bus.*

OIT has procured and is implementing a tool statewide for capabilities including identity administration, access management and password management. Specifically the Department's current timeline for implementation is:

Phase 1: For the Department by December 2017 to support password management. OIT expects to have development and test environments configured for the state enterprise environment for the advanced capability in May 2018.

Phase 2: Begin phase 2 of identity management and security in July 2018. This phase includes OIT connecting basic services including Active Directory, Google, Service Desk, and other foundational services, requiring 2-3 weeks for implementation. Once approved to move to implementation phase of interoperability, OIT will also include connecting Trails, CBMS, and other CDHS applications in coordination with those programs' operational schedules.

Phase 3: Implement Enterprise Service Bus to improve cross-agency collaboration. For the enterprise service bus, OIT has selected a tool called Mulesoft. Within the Department, Mulesoft is being used to transmit data between systems for the Low-Income Energy Assistance Program (LEAP) as well as the Colorado Benefits Management System (CBMS). OIT is using this tool as the state's primary means to support projects in other state agencies such as the Unemployment Insurance effort at the Colorado Department of Labor and Employment as well as HRWorks within the Department of Personnel and Administration. OIT is establishing a team to develop and maintain Application Programming Interfaces (APIs) within Mulesoft. OIT also plans to provide training for other agencies to use these APIs for data connections. The benefit of this work is that agencies can reuse data connections to add additional systems and data exchanges, where in the past point-to-point interface development could cost \$10,000 - \$40,000 per interface and essentially be used only once.

d) *Implement professional consumer portal.*

The Department will begin implementation of the professional consumer portal upon approval of the IAPD by CMS.

7. For the federal match, does the department have any mandated deadlines that impact the schedule? Please provide details, and if applicable, any references.

There are no federal or department mandated deadlines relevant to the 90/10 federal funding match. The A-87 Cost Allocation waiver which allows CMS to provide the full 90% matching funds expires December 31, 2018. If the federal government does not extend the waiver beyond December 2018, the Department will work with the Department of Health Care Policy and Financing to explore allocating costs across all federal programs benefiting from the Interoperability project. A list of systems and programs is included in response to question 8 below.

8. Please describe the project's plan to ensure best practices and standards for IT security are implemented with this project's deliverables, including disaster recovery and business continuity.

All contracts and implementation efforts will include language mandating full compliance with the State of Colorado Cyber Security Policies. The Cyber Security Policies are issued under the authority of 24-37.5-401 through 406 C.R.S and are based largely on the National Institute of Standards and Technology (NIST) and the Cybersecurity Framework.

With regard to Disaster Recovery and business continuity, this is largely managed at the system level but a focus will be placed on overall connectivity among component parts. Although providing high availability architectures can be cost prohibitive, when possible, these principles will be promoted.

Fiscal Year 2018-19 Information Technology Request

Governor

Health IT Roadmap Initiatives

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-149

Approved Program Plan?

N/A

Date Approved:

The Governor's Office of Information Technology (OIT) worked with the department to help plan the Health IT Roadmap initiatives. Implementation of the initiatives will be accomplished in cooperation with OIT and will align with its enterprise health IT architecture model.

PRIORITY NUMBERS

Prioritized By

Priority

Dept/Inst

1 of 1

OSPB

6 of 7

Recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$1,875,500	\$1,150,833	\$445,000	\$3,471,333
FF	\$0	\$4,729,500	\$10,357,500	\$4,005,000	\$19,092,000
Total	\$0	\$6,605,000	\$11,508,333	\$4,450,000	\$22,563,333

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$6,605,000	\$11,508,333	\$4,450,000	\$22,563,333
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0
Software Acquisition	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$6,605,000	\$11,508,333	\$4,450,000	\$22,563,333

PROJECT STATUS

This is a new, never-before-requested project.

PROJECT DESCRIPTION / SCOPE OF WORK

The Governor's Office of eHealth Innovation (OeHI) and the Colorado Department of Health Care Policy and Financing (HCPF) are requesting a combination of state funds and federal funds spending authority for the first phase of a three-phase project to implement nine initiatives related to Colorado's Health IT Roadmap (Roadmap), including health delivery reform, payment reform, improvements to care coordination, cost reductions, and health care value improvements. The initiatives will build upon the state's current health information infrastructure in order to improve health care delivery and payment models. The project includes the following nine initiatives.

(1) Easing the quality reporting burden for providers by expanding and enhancing health IT infrastructure to ease the capture, aggregation, and creation of multiple reporting requirements from state and federal programs, and from various commercial payers.

Fiscal Year 2018-19 Information Technology Request

Governor

Health IT Roadmap Initiatives

(2) Uniquely identifying Coloradans and health providers across systems through a master person index and a master provider directory. The master person index will uniquely identify a person across multiple systems and types of care while the master provider directory will uniquely identify a health care provider, its affiliations, and patient relationships.

(3) Expanding consent management for Colorado's two health information exchanges (HIEs), the Colorado Regional Health Information Organization (CORHIO), and the Quality Health Network (QHN) to share behavioral health and substance use clinical data by expanding to a statewide consent framework. The goal of this initiative is to reduce variations in privacy law interpretations and inconsistent patient consent procedures among providers.

(4) Implementing an online portal for consumers to shop for health care, by comparing cost, service, and quality. The online portal will connect consumers to self-service, interactive resources, and may empower consumers to make informed decisions.

(5) Advance HIEs across Colorado by expanding access for providers and residents. The goal of this initiative is to provide additional services, such as improved identity management, new payment models, population-level analytics, automated patient consent, and quality measurements.

(6) Funding statewide research to develop approaches for care coordination technology investments that align with other statewide efforts. This is a collaborative approach with Colorado's HIEs led by case managers, care coordinators, and patient navigators. Care coordination involves communication, education, information sharing, care planning, and care management activities that support health and prevention. OeHI says these activities are critical to manage costs and achieve the best outcomes.

(7) Create a health IT program management office (PMO) to ensure the state's health information technology projects are following best practices, incorporating health data standards, following technical and security standards, and are aligned with the state's vision, infrastructure, and architecture.

(8) Align and lead a process of statewide health information governance and data governance. Health information governance is a business-driven and compliance-driven approach to managing and controlling enterprise content. Data governance is the overall management of the availability, usability, integrity, and security of data.

(9) Hire a term-limited systems integrator subject matter expert to promote efficient, cost-effective system architectures, and to ensure the interoperability of Colorado's core health IT infrastructure and systems.

Federal funds. OeHI expects a 90/10 percent match funding model for all initiatives except for the online health cost portal, which is state funded.

PROJECT JUSTIFICATION

According to OeHI, federal funding to build and improve Colorado's health IT and health information exchange infrastructure is available through September 2021. The department says that without state support, Colorado could fall behind in the necessary infrastructure to advance access to health information, reduce costs through better coordination of care, improve consumer engagement and health literacy, and continue the integration of physical and behavioral health. OeHI states that the initiatives help improve the accurate exchange of health information care coordination, and improve the accuracy of health data analytics. OeHI notes that aggregated data could be used to track state investments and reduce costs.

Additionally, OeHI states that the project will help health care providers automate required data collections. OeHI states that Colorado providers face several risks by not adapting data and payment reforms. These potential risks include: losing health care providers, especially in rural areas; continuing costly, volume-based payments models; a lack of quality care; and not meeting Colorado's health care goal of "best care, best health, and best value."

Fiscal Year 2018-19 Information Technology Request

Governor

Health IT Roadmap Initiatives

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

This project includes implementing new systems, leveraging existing systems, and employing term-limited subject matter experts in order to achieve Colorado's health care goals. The department says that the implementation plans for the initiatives will be developed by OeHI, in collaboration with the State Innovation Model (SIM), OIT, the Health IT PMO, and governed by the eHealth Commission, which serves the steering committee that participated in the creation of the Roadmap.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

OeHI states that it will focus on the state's Medicaid population before expanding the initiatives' scope statewide. OeHI and HCPF are partnering with HIEs to reduce costs and improve quality of care by reducing medical errors, reducing readmission rates, and reducing redundancy. Also, OeHI states that the project will enhance health provider notifications and shared information in order to further improve care and reduce costs. Additionally, OeHI states that the project will help advance the state's foundational health IT systems and programs and further integrate Colorado's electronic health record (EHR) systems and HIEs.

SECURITY AND BACKUP / DISASTER RECOVERY

OeHI says the project plans will streamline and provide access to protected health information and confidential data. The project will comply with state and federal privacy laws. The department will require vendor compliance with national security standards, such as those required by FedRAMP, NIST, and HIPAA. Additionally, OeHI says it plans to work closely with OIT's Chief Information Security Office and other IT security professionals from Colorado's major health organizations and hospitals. The department will also follow OIT's project methodology, which requires a disaster recovery plan.

BUSINESS PROCESS ANALYSIS

Market research recently conducted by the department indicated that other states that have pursued similar projects have realized significant returns. OeHI summarizes the health care values as:

- improved data quality;
- improved consumer engagement and health literacy;
- improved coordination of projects, data, and systems; and
- improved care coordination.

Project alternatives. OeHI states that a range of options will be considered for the project. However, according to OeHI, because the Colorado Health IT Roadmap was recently finalized, final project options have not been fully developed, considered, or evaluated. OeHI states that the final project will focus on technology that can be leveraged by and scaled to other systems. Additionally, the department is also considering alternative funding solutions, public-private partnerships, and other unique and innovative solutions for the project.

Fiscal Year 2018-19 Information Technology Request

Governor

Health IT Roadmap Initiatives

PROJECT SCHEDULE

Preliminary Roadmap Plan:

	Start Date	Completion Date
Stakeholder Engagement	December 2017	2022, Ongoing
Governance	Pre-2017	2022, Ongoing
Resources and Financial Components	Pre-2017	2022, Ongoing
Privacy and Security	December 2017	2022, Ongoing
Digital Health Innovation	Pre-2017	2022, Ongoing
Other Technology	Pre-2017	2022, Ongoing

OPERATING BUDGET

OeHI says that the project will have corresponding operating costs beginning in FY 2019-20. Operating costs will include system maintenance, upgrades, contractual services, OIT staffing, subscriber hosting fees, and licensing fees. The department plans to submit operating budget requests as follows:

- FY 2019-20: \$2,730,000 (\$1,627,500 General Fund and \$1,102,500 federal funds);
- FY 2020-21: \$6,368,692 (\$3,446,846 General Fund and \$2,921,846 federal funds); and
- FY 2021-22: \$6,368,692 (\$3,446,846 General Fund and \$2,921,846 federal funds).

STAFF QUESTIONS AND ISSUES

See attached.

FY 2018-19 IT Capital Construction Requests

Governor's Office of eHealth Innovation (OeHI) and
Colorado Department of Health Care Policy and Financing (HCPF)
Colorado Health IT Roadmap

Joint Technology Committee (JTC) Staff Questions

1. The department's 2018-19 Colorado Health IT Roadmap Initiatives budget request (budget request) describes nine initiatives. For each initiative, please provide the major milestones, the respective planned start and end dates, along with the name of the technical system deliverable(s) or research / governance goals.
 - a) *The high-level Colorado Health IT Roadmap was recently completed on November 15, 2017. Transition planning is occurring now, and detailed, project-level planning (identifying start/end dates, milestones, etc.) will commence early in 2018. A high level, preliminary plan, developed for the Roadmap, is attached as Appendix A.*
 - b) *Not all of the Roadmap Initiatives involve "new systems" – some Initiatives seek to advance and leverage systems already in place, or seek to promote best practices across the state.*
 - c) *Detailed plans for the "Unique Person Identification" Initiative, which preceded development of the Roadmap, includes these key milestones:*

Public Comments Complete	Thu 12/28/17
Send RFP to CMS for Review and Approval	Tue 1/16/18
CMS Review Complete	Thu 3/15/18
RFP Drafting Complete	Tue 3/20/18
RFP Posted	Thu 3/22/18
Proposals Due	Mon 4/23/18
Vendor Demonstrations Complete	Tue 6/5/18
Vendor Selected	Tue 6/26/18
Send Contract to CMS for Review and Approval	Mon 7/23/18
CMS Approval Complete	Thu 9/20/18
Contract Executed	Wed 9/26/18

- d) *Detailed plans for the "Ease Quality Reporting Burden" (eCQM) initiative, which preceded development of the Roadmap and is currently being implemented with investment dollars from the Colorado State Innovation Model (SIM), (and as a precursor to a statewide rollout - which is supported by the budget request), includes these key milestones:*

Procurement process/Vendor selection complete: CORHIO identified as the vendor	10/31/2017
Electronic Clinical Quality Measure (eCQM) functional and business requirements finalized	12/08/2017
OIT reviews draft contract and business requirements, processes SOW thru OIT process	12/31/2018
Contract executed between SIM and CORHIO	2/01/2018
Phase one SIM primary care practice onboarding and technical assistance	Thru May 2018
Phase Two SIM primary care practice onboarding and technical assistance	Thru July 2018
Phase Three SIM primary care practice onboarding and technical assistance	Thru Dec. 2018
Phase four SIM primary care practice onboarding and technical assistance	Thru March 2019

FY 2018-19 IT Capital Construction Requests

Initial focus groups and framework recommendations for eCQM extraction governance process complete	10/31/2017
Final recommendations for eCQM governance process agreed upon by SIM, OeHI and HCPF	12/31/2017
Governance structure implemented with subject matter expert group committed to monthly meetings through July 2019	1/30/2018
eCQM organizational and data governance policies and procedures documented and implemented	7/31/2018
Colorado SIM eCQM governance pilot recommendations provided to OeHI	6/30/2010

2. Please list term-limited human resources, role descriptions, applicable initiative, and the estimated hours and rate used to determine the costs. If the department included any full-time, permanent employees (FTEs), please list separately and indicate if the department plans to submit the FTEs request to the Joint Budget Committee.
 - a) *There are no permanent full-time equivalents (FTEs) being requested; there are two (2) term-limited, contract roles (project managers) that will help support delivery of the RoadMap initiatives and related projects.*
 - b) *The applicable Roadmap initiatives where the project managers will be assigned include Care Coordination, Person Identification, Provider Directory, Electronic Clinical Quality Measures (eCQM), Consent Management, Advancing HIEs/Data Sharing, as well as helping to coordinate the 90+ health IT projects already in process across the various state agencies.*
 - c) *These project managers will begin to organize a health IT-focused Program/Portfolio Management Office (PMO) – to better coordinate health IT projects across State agencies and across the state of Colorado.*
 - d) *The role of the project managers will be to organize, scope, plan, resource, manage vendors, and ensure delivery of project objectives, deliverables, new systems, new interfaces, new processes and changes (“change management”) that will produce the desired outcomes and benefits of the project/initiative. The project managers are also responsible for a smooth transition to support (steady state operations); it is anticipated that most new systems will be run “as a service”, off site, by vendor-hosted (cloud-hosted) “software as service” offerings.*
 - e) *The rate used to budget for the term-limited project managers was based on an annual salary \$125,000, for two senior health IT Project Managers, for approximately two (2) years, as an “implementation-associated” capital investment (\$500,000). The ongoing operating budget, which will be requested separately, would eventually ramp up the PMO to five to seven project managers over time, as needs warrant.*

3. Regarding all nine initiatives, please describe the roles and responsibilities between OeHI and HCPF. Please also describe Colorado’s eHealth Commission, including its authority or charge, the members and its relationship with OeHI, HCPF, and the budget request’s nine initiatives.
 - a) *These attributes apply to all nine (9) Initiatives requesting funding.*
 - b) *OeHI and the eHealth Commission were established by Executive Order (attached).*
 - c) *OeHI’s role is to advance health information technology across Colorado, in support of health reform and improved health for all Coloradans; OeHI is the “State Designated Entity” (SDE) to receive and manage federal grants (including federal matching funding) that support delivery of health information, and health information exchange*
 - d) *HCPFs role is to support OeHI by housing and managing contracts, paying invoices, and by providing assistance with: procurement, finance, budgeting, communications, program management, and administrative assistance. This eliminates the need for additional staff or contractors to support OeHI.*

FY 2018-19 IT Capital Construction Requests

- e) *The eHealth Commission was established as an “advisory board” to OeHI, to ensure broad stakeholder engagement, input, and guidance. Health Care Policy and Financing (HCPF), Colorado Department of Public Health and Environment (CDPHE), Colorado Department of Human Services (CDHS), and the Office of Information Technology (OIT) are represented on the Commission, along with other roles across the state that represent providers, payers, consumers, health information exchanges, and other digital health and policy experts. The eHealth Commission served as the “Steering Committee” in the development of the Health IT Roadmap, and will continue serving as the “Steering Committee” in the delivery of Roadmap initiatives, programs, projects and deliverables.*
- f) *The current eHealth Commissioners are as follows:*
- *Kendall Alexander – (North Range Behavioral Health); behavioral health*
 - *Dr. Ann Boyer (Children’s Hospital Colorado) – pediatrician; consumer representative*
 - *Adam Brown, (Anthem) – payer representative*
 - *Jon Gottsegen, (OIT) – OIT representative*
 - *Jason Greer, Co-Chair, (CCMCN) – federally qualified health centers (FQHCs)*
 - *Morgan Honea, (CORHIO) – health information exchange (front range)*
 - *Marc Lassaux, Co-Chair, (Quality Health Network) – health information exchange (western slope)*
 - *Mary Anne Leach, (OeHI) – Director, OeHI*
 - *Michele Lueck, (Colorado Health Institute) – policy and analytics representative*
 - *Michelle Mills, Chair - (Colorado Rural Health Center) – rural health representative*
 - *Dana Moore, (Children’s Hospital Colorado) – chief information officer*
 - *Dr. Gregory Reicks (Foresight Family Physicians) – physician representative*
 - *Chris Underwood (HCPF) – HCPF representative*
 - *Chris Wells (CDPHE) – CDPHE representative*
 - *Herb Wilson (CDHS) – CDHS representative*
 - *Tanya Ziegler (Kaiser Permanente) – digital health expert*
4. The state has several healthcare technical projects, such as the Colorado Department of Human Services (DHS) Interoperability project and Electronic Health Record (EHR) projects. As it pertains to budget request’s nine initiatives, please describe the relationship and status with other Colorado departments and primary stakeholders (e.g., regional care collaborative organizations, Colorado Regional Health Information Organization (CORHIO) and Quality Health Network – (QHN).
- a) *The Health IT Program/Portfolio Office (Health IT PMO) – one of the nine initiatives, has been proposed for this very purpose: to help manage and coordinate the various health IT projects across the state (and across State agencies), including the EHR projects, connecting the Interoperability work to other Initiatives, connecting the Person and Provider identity projects to the Interoperability effort, etc. – and connect the many other systems and projects where there are opportunities for alignment, efficiency, value-add, and cost-savings. The aim is to “build once”, “connect”, and “scale”, vs. build many and duplicate.*
- b) *In support of advancing CORHIO and QHN – one of the Initiatives is to help improve, and leverage, our two (2) health information exchanges. CORHIO, through SIM, will begin development of the electronic clinical quality reporting tools (“Ease Reporting Burden” Initiative); this budget request will help fund “scaling out” this reporting solution statewide. CORHIO, QHN, and/or other partners are also potentially the “solution providers” of the Person and Provider Identity Initiatives, and Care Coordination.*
- c) *Another Initiative – creating a statewide Technical Health Information Architecture for the state of Colorado – is designed to help more strategically connect and integrate our state’s health IT infrastructure; the funding request represents a “Systems Integrator” which will help to design, architect, and integrate the various components, under this architecture Initiative.*

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- d) *One of the “guiding principles” of the Roadmap effort is to leverage the infrastructure already present in the state – our E.H.R.s, our health information exchanges, the All Payer Claims Database, etc. – rather than “building new” – wherever possible.*
5. Since many of the nine initiatives streamline and provide access to PHI, confidential and sensitive data and multiple types of users will have access to this data, such as clinicians and health providers that may have offices in more than one state, how does this project plan to ensure compliance with federal and state laws? Will the department work with the Governor’s Office of Information Technology (OIT) Chief Information Security Office (CISO)
- a) *OeHI and the eHealth Commission recognize the privacy and security requirements and concerns. One of the Initiatives in the Roadmap (though not in this funding request) is to “Promote Best Practices for Cybersecurity”. Most major health systems and hospitals in Colorado have security professionals and security programs in place, but smaller organizations and physician practices across the state will likely need additional expertise and support in this area.*
- b) *Earning and keeping our citizen’s trust, with PHI, is paramount. Without it, our state will not succeed at sharing health information, improving quality and reducing costs. Compliance with security standards such as Fedramp¹, NIST², and HIPAA³ will be required, and any vendors selected for this work must prove that they comply with these standards.*
- c) *OIT’s Chief Information Security Officer, and the related working groups, will be consulted regularly.*
6. Besides the partnerships described above, how does the department plan to work with OIT? Does the department plan to leverage OIT’s Single Sign On or Identity Management?
- a) *OeHI has integrated representation from OIT (Deanna Towne, Director), into the extended “project team”, and plans to continue working closely with OIT.*
- b) *OeHI will contract with OIT for project managers, and will collaborate in creating the Health IT PMO together*
- c) *OeHI may leverage OIT’s investments in the Enterprise Service Bus (Mulesoft), and in the CRM platform (Salesforce), as potential infrastructure components to connect, and operate, these new systems.*
- d) *OIT has a standing representative on the eHealth Commission (currently, Jon Gottsegen, the Chief Data Officer); OeHI’s State Health IT Coordinator, Carrie Paykoc, also sits on OIT’s GDAB – the state’s data governance advisory board.*
- e) *The Identity Management platform being considered for citizens, statewide, is also a possibility for the Unique Person Identification Initiative, provided requirements for both capabilities can be met with one solution; OeHI and OIT will continue these discussions and evaluations to determine if a single solution can work for both sets of requirements.*
- f) *Single Sign On will be strongly preferred, wherever users are asked to access multiple systems, and OeHI will seek to leverage OIT’s investments in this domain.*
7. The budget request says that the Colorado’s State Innovation Model (SIM) is a four-year initiative funded by the Centers for Medicare & Medicaid Services (CMS) to integrate behavioral and physical healthcare in Colorado. Does the department know how SIM is involved in other efforts throughout the state? Who develops and updates the Colorado SIM? How many years are remaining for SIM funding? What happens after the SIM funding time-period?
- a) *SIM is a federal initiative that is funded by the Centers for Medicare & Medicaid Services through July 2019, and will help 400 primary care practices and four community mental*

¹ <https://www.fedramp.gov/resources/documents-2016/>

² <https://www.nist.gov/topics/cybersecurity>

³ <https://www.hipaajournal.com/hipaa-compliance-checklist/>

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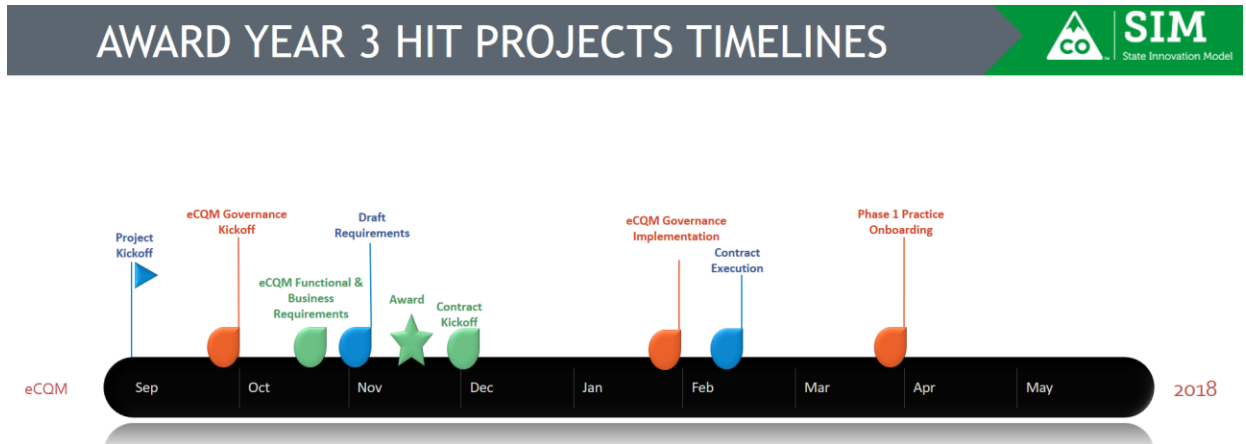
health centers integrate behavioral and physical health in primary care settings and test alternative payment models. SIM has led efforts in the state to prioritize HIT investments.

- b) Since the inception of OeHI, SIM team members have partnered with HCPF and OeHI to advance HIT efforts with a coordinated, complementary approach. SIM is leading HIT investments that will support healthcare reform efforts underway and continues to work closely with OeHI, HCPF and other state agencies. SIM, OeHI, HCPF, and OIT have weekly coordination meetings. Barbara Martin, SIM director, regularly attends and presents at the eHealth Commission to ensure that the group understands the work that SIM is leading.*
- c) SIM is focused on health care delivery and payment reform and HIT is one of the key pillars that drives sustainable practice transformation. A primary goal for this statewide initiative is to promote the secure and efficient use of technology. SIM broadly supports movement towards value-based payment models in the state, with a focus on integrating behavioral health into primary care as a key step to containing costs and improving patient outcomes. The SIM HIT investment encompasses the following areas:*
 - i) Effective and efficient data sharing through electronic clinical quality measure reporting (detailed above);*
 - ii) Telehealth expansion and development of an e-consult model that enhances access to cost-effective care and removes barriers to care; and*
 - iii) Claims data aggregation across commercial and private payers to provide doctors and clinicians with comprehensive data on cost and utilization data that can be used to more effectively and efficiently provide care.*

Integration of behavioral health and physical health in primary care is key to effectively providing care within value-based payment models. SIM investments across the state will help the state accelerate its progress toward the Quadruple Aim of lower costs, better care, improved population health and provider satisfaction.

- d) Colorado, under the leadership of Governor Hickenlooper, was awarded a four-year SIM cooperative agreement totaling \$65 million from the Center for Medicare and Medicaid Innovation (CMMI) to drive innovation in health care delivery and payment reform. The initiative has successfully recruited two cohorts of practices and is on target to reach 400 primary care practice sites and four community mental health centers by July 2019.*
- e) One of SIM's primary goals is to advance health information technology that supports meaningful and sustainable practice transformation efforts. SIM has received valuable feedback from practices and clinical health information technology advisors funded by SIM about HIT-related challenges and has used that information to invest in workable solutions. For the electronic clinical quality measurement (eCQM) effort mentioned in the budget ask, Colorado's Health Information Exchange Regional Organization (CORHIO) is developing the technology and intends to update and sustain the technology over time. The OeHI budget ask is to expand and scale the technology, statewide (beyond SIM) and support sustainable, ongoing operations. SIM funding will help the state has established more effective partnerships between public health, behavioral health and primary care sectors.*
- f) All SIM funding is reviewed and approved for release by the Center for Medicare & Medicaid Innovation (CMMI) a division within the Centers for Medicare and Medicaid (CMS). SIM is currently in year three of a four-year award. Year three funding is available to move forward SIM's electronic clinical quality measurement reporting tool in FY 2018/2019.*

There are approximately 18 months remaining for SIM work. This budget ask is to expand this effort beyond the 400 SIM practices to all interested practices statewide under a sustainable, subscription fee model.



8. The budget request says, under the *Proposed Solution* section, that the American Recovery and Reinvestment Act of 2009 (ARRA) Health Information Technology for Economic and Clinical Health Act (HITECH) will provide the 90% federal matching funds to organizations that “have sustainability plans for the initiatives through public and private funding models”. What are the risks and assumptions for the federal funding? Does the status of SIM impact the federal funding?
 - a) The assumption is that federal 90/10 matching is available for many of the Roadmap projects through 2021. There is always some risk that federal funding availability, or matching requirements, could change; however, to date, there have been no indications of these risks manifesting. Representatives from the Centers for Medicare and Medicaid Services (CMS), along with representatives from the Office of the National Coordinator (ONC) have been very supportive of Colorado’s plans, projects, and outcomes - and have been encouraging forward momentum.
 - b) Public/private models of funding are being explored, and would be excellent methods to sustain operations and add value over time.
 - c) While the SIM project is independent from the Roadmap, SIM is providing funding, development, testing and implementation (for approximately 400 practices) for the electronic clinical quality measure reporting (eCQM) capabilities (mentioned above). The Initiative (Ease Quality Reporting Burden) would seek to leverage the lessons learned from SIM, “scale out” the technologies beyond the SIM practices, and develop a sustainable, subscription service to help Colorado providers report quality measures and participate effectively in value-based payment models.

9. Please describe those initiatives that may result in another IT capital construction request in the future, and the department’s plan for public and private funding, including the initiatives impacted and current status.
 - a) The Roadmap initiative “Ease reporting burden” is an opportunity to engage public and private insurance payers in support of effective data sharing, as well as their engagement in supporting future funding needs. Future potential models include a subscription service model.
 - b) The initiative to “integrate behavioral, physical, claims, social, and other health data” is currently funded by SIM with a commitment from payers to aggregate their claims data in one reporting tool for clinicians (to reduce burden of accessing multiple tools). Strategic planning is ongoing to assess the plan for public and private funding.
 - c) The Initiative to “Support Care Coordination in Communities Statewide” may require additional future funding, since it is probably the least mature in terms of detailed requirements, market research, RFIs/RFPs, and a clear understanding of the scope/scale

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- challenges. QHN has made great progress in these areas, and many of our estimates have been based on their early research and planning.*
- d) Private funding may also be available, as many of these Initiatives become “topics” for Colorado’s digital health innovation community, through “challenges” and “challenge grants”, for instance. Care Coordination, Person Identification, advances in data sharing and analytics, easing reporting burden, engaging consumers in their health – are all possible topics that lend themselves to innovative approaches, business enterprise and private funding opportunities.*
 - e) As other detailed plans come together for the Initiatives in the Roadmap, there may be need in the future for additional funding (or IT capital construction requests). However, enough is known to draw down the federal 90/10 match while it is still available (until 2021). And pending CMS approval, it may also be possible to shift funds between Initiatives as the need arises, to reduce any need for future funding requests.*
10. For those initiatives that include an IT system deliverable, please describe the operations and maintenance (O&M) plan? What state department(s) will be maintaining these systems? Does the state have existing FTEs and infrastructure to support these systems? If the state will not be maintaining a system, please describe the O&M model.
- a) The Operations and Maintenance (O&M) model being pursued is the “software-as-a-service” model, and/or “infrastructure/platform-as-a-service” model, where any new systems would be hosted, managed, and operated off-site for a user/subscription fee. OeHI does not anticipate adding new systems to the OIT portfolio to manage, but rather contracting for “-as-a-service” models. At the same time, OeHI will seek to leverage OIT’s investments in identity systems, integration platforms (e.g. Mulesoft), and customer relationship management systems (e.g. Salesforce), wherever those capabilities are a fit.*
 - b) Colorado’s Health Information Exchanges (CORHIO and QHN), for example, could also be “hosts” of these new systems, where appropriate – particularly where integration of clinical and related services data are involved.*
 - c) The associated operating budgets have been developed anticipating this model – where contracted services would be utilized.*
 - d) The goal is to not build, or host, anything “new” – but rather to leverage what’s currently available, and contract for any new capabilities required through off-site, cloud-hosted models wherever possible.*
11. House Bill 15-1266 requires all information technology budget requests to identify and quantify anticipated administrative and operating efficiencies or program enhancements and service expansion through cost-benefit analyses and return-on-investment calculations. For each initiative, the budget request has provided planned annual operating costs; however, please also provide potential cost savings, and a return on investment calculation or cost benefit analysis. Please quantify any assumptions used.
- a) Specific cost-benefit analyses, or return-on-investment calculations, have not yet been performed for each of the proposed Roadmap Initiatives. However, market research (attached as Appendix C and D) indicates that where other states have pursued these goals, relative returns have been significant. The “value propositions”, generally, can be summarized as follows:*
 - **Improved data quality** (through the Initiatives addressing accurate person identification, provider identification, clinical quality measure reporting, data governance) – will bring efficiencies to both public and private entities that provide, insure, or coordinate health care. Today, many inefficiencies are created due to poor data quality, creating additional costs and administrative burden for many organizations, providers, payers and consumers.*
 - **Improved consumer engagement** – and improved health literacy, can help improve outcomes and lower costs of care.*

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- **Improved coordination of projects, data and systems** – through a Program/Portfolio Management Office, through Improved Information Sharing, and through an organized, systematic Technical Architecture for Colorado, can help reduce duplication, reduce costs, and can help coordinate integration where appropriate.
 - **Improved care coordination** – can reduce costs, improve outcomes, improve the patient experience, and improve the value stakeholders receive from participation in the broader health care ecosystem.
12. Senate Bill 17-304 requires that budget requests submitted to the JTC should include a range of options for completing the project, including the estimated costs for such options. Although the budget request provides justification for the request, did the department consider any other options to meet the requirements for each initiative? Please include details and cost of the alternatives.
- a) *A range of options will be considered for each Initiative and project undertaken; however, since the Roadmap was just recently completed, and the Initiatives just recently identified, the options have not yet been developed, considered, and evaluated.*
 - b) *Alternatives and options will be considered, particularly where currently available technology can be leveraged and scaled, vs. new technology acquired.*
 - c) *Emerging standards and technologies, alternative funding solutions, public/private partnerships, and other unique and innovative solutions will also be considered.*
13. Senate Bill 17-304 requires that budget requests submitted to the JTC should include: (1) information from a request for information (RFI) or other formal market research regarding the information technology budget request; and (2) any other available and relevant information obtained from the market research related to the information technology budget request. Has the department published any RFIs or conducted market research? If so, please summarize the RFI or market research conducted for each initiative.
- a) *Market Research was conducted by Health Tech Solutions (HTS), OeHI's health IT consulting partner; the resulting market research document is attached.*
 - b) *The market research supports these investments, and a summary of the research is also attached.*
 - c) *An RFI (request for information) was recently released as a Request for Public Comment on the Request for Proposal, for a person identification solution for the State of Colorado.*
 - d) *As the Initiatives mature and spin off "projects", market research, RFIs, and RFPs will be critical components of the next wave of activity.*
14. The budget request, on page 2, says that sharing information with other health providers and insurers for value-based payment as required by Medicare Access and CHIP Reauthorization Act of 2015. The budget request describes its health goal as a healthcare transformation from paying based on volume to paying based on value. The budget request further explains that this goal requires health information that is accessible, consistent, trusted and reportable. Define pay-based healthcare vs value-based healthcare. Please explain how these initiatives advance the state from pay-based to value-based?
- a) *The Health Care Payment Learning and Action Network (HCPLAN) has defined categories of alternative payment models (APMs) that satisfy the criteria of value-based payment, and that is how the Colorado Multi-payer collaborative (MPC) defines value-based payment models. The MPC is a voluntary collaborative of public and commercial payers focused on health care quality improvement in support of value based payment that meets regularly to advance quality and effective care delivery in the state. There is a continuum of models that fit into the HCPLAN's four, broad categories (HCPLANValueBasedPayment). This framework has been adopted nationally by federal partners as well as public and private payers, and it is used in our state. This is also referred to as "payment reform." The projects in the budget request align with SIM and Medicaid efforts to develop provider care*

alternative payment models that deliver value-based care. The SIM initiative is helping providers gather, report and use data more effectively so they are able to negotiate mutually-beneficial value-based contracts. The SIM team appreciates the fact that value-based payment is a foundational element to moving towards a health care system that incentivizes the value of care delivered versus the volume of services provided. More information on the Medicaid Alternative Payment Model can be found at: <https://www.colorado.gov/pacific/hcpf/primary-care-payment-reform-3> and more information about SIM payment reform can be found at: <https://www.colorado.gov/healthinnovation/resources-9>.

- b) The new “pay for value” models are directly supported by these key Roadmap initiatives: more accurate patient identification, more accurate provider identification, HIE and data sharing, Care Coordination, data governance, and by providing tools for electronic clinical quality measure reporting.*

Initiative 1: Ease Quality Reporting Burden for Providers, Electronic Clinical, Measurement (eCQM) Reporting and Analytics Initiative

- c) This Initiative will help providers (physicians and others) automate the collection of clinical quality measures (as a byproduct of their clinical workflows within electronic health records); these measures are reported to Medicare, Medicaid, and commercial payers – and they are used in the calculation of value-based payments. The new eCQM tools and systems will help Colorado providers be successful in value-based care. As a state, if we are not successful in helping providers adapt to payment reform, the following impacts are possible: 1) we’ll potentially lose providers (which would be acutely felt in already underserved rural areas); 2) we would continue to experience costly, volume-based payment models; 3) we will not realize the full spectrum of quality care that Coloradans expect; and 4) we will not realize Colorado’s Triple Aim: Best Care. Best Health. Best Value.*
15. According to the budget request on page 5, “eCQMs are tools that help measure and track the quality of healthcare services provided by professionals and hospitals within the healthcare system”. What is the timeline for submitting for federal funding for the state’s eCQM tools? What other states or government entities have implemented similar eCQM tools? What were the results?
- a) OeHI will initiate the request federal funding from CMS for state FY 2019/2020 in February 2018. OeHI will update CMS regarding the federal funding request throughout SIM’s project. The first phase of onboarding is set for April 2018. Depending on approval of state funds the review approval/cycle the initial federal funds will be available in fall of 2018. A comprehensive project plan and timeline will be developed for a statewide eCQM solution based on the outcomes of SIM eCQM efforts.*
 - b) Many other states have implemented similar eCQM tools for their health provider community. Michigan and Oklahoma are leaders in this effort and have improved care and reduced costs through this venture over the last decade. Other states that are beginning to also launch efforts include Idaho, Oregon, Rhode Island, Ohio, Washington, and many other states. The preliminary results are positive.*
16. To achieve the goals of the Colorado Health IT Roadmap Initiatives, will the eCQM tools need to interact with other systems (e.g., EHR)? If so, please summarize and describe any risks or issues with these interfaces (e.g., compatibility, data integrity between systems)

The eCQM systems extract discrete data directly from individual EHRs to an external tool to validate the measurement and report to many state, commercial and federal entities. The goal is to leverage existing connectivity, processes, and systems to streamline reporting. To meet federal standards for quality measurement reporting the electronic health records must meet the Office of the National Coordinator’s 2015 Certification requirements. Some practices may

have systems that do not meet this requirement or have an existing EHR. For these instances, manual reporting of quality measures and exploration of upgrades and low-cost systems will be needed. Automated reporting of quality measures is a new process for health providers and insurance payers. Technical assistance to improve data quality, and change management are crucial to success of these efforts/

Initiative 2a: Uniquely Identifying Coloradans and Health Providers Across Systems, Master Person Index Initiatives

17. What is Triple Aim and how does it relate to this initiative?

- a) *The Triple Aim⁴ was originally coined by Dr. Don Berwick and the Institute for Healthcare Improvement (IHI) in 2007; it is a single objective (aim), with three dimensions: improving the experience of care, improving the health of populations, and reducing the per capita costs of care. Colorado has developed its own version on the Triple Aim: Best Care. Best Quality. Best Value.*
- b) *The Colorado Roadmap, and the resulting Initiatives within the Roadmap, have used Colorado's Triple Aim as it's "north star" – guiding our collective efforts toward improving patients' and consumers' experience of health care; toward improving quality and clinical outcomes of care, and toward lowering the costs of care.*
- c) *The Triple Aim is tangibly supported by accurate person identification, since accurately identifying the correct person/patient is critical in bringing together (accurately, and completely) all the clinical results from disparate systems (in E.H.R.s and H.I.E.s), and ensuring "the whole picture" is available – supporting improved quality of care – and reducing the costs of care, by reducing unnecessary duplication.*

18. The budget request says that "there are many siloed Master Patient / Person Index (MPI) implementations". Please summarize the entities that will be impacted by this initiative's Master Person Index. Have these entities agreed to change or interface their systems in order to implement the Master Person Index?

Initiative 2b: Uniquely Identifying Coloradans and Health Providers Across Systems, Master Provider Directory Initiatives

- a) *These initiatives (regarding person and provider identification) do not contemplate replacing any current systems of unique person identification in place today. HCPF has several approaches to person matching; these may be systematic approaches implemented through CBMS when individuals apply for benefits, or within other workflows as a manual process of Social Security Number and address combinations. DHS also has several approaches to matching client records. The two health exchanges each have person identification systems (or "MPIs"); every hospital, health system, and physician practice has an MPI. Every electronic health record system (E.H.R.) has an MPI – it's the way that results are pulled together, from disparate sources, into a single "patient-centered view".*
- b) *Rather, this Initiative proposes a statewide, or "Enterprise Person Index" (where the State would be the "Enterprise") that can link them all together to help coordinate care and services, more effectively across the entire domain of health, and health-related social services, across the state of Colorado.*
- c) *"MPIaaS", or "MPI as a Service", is the model being contemplated, offering voluntary participation. Providers or payers could link to the statewide MPI to improve person identification, and see the totality of health and related services – thus improving the quality of care, the coordination of care, and reducing unnecessary duplication of services.*

⁴ <http://www.ihi.org/communities/blogs/layouts/15/ihi/community/blog/itemview.aspx?List=81ca4a47-4ccd-4e9e-89d9-14d88ec59e8d&ID=63>

19. Please summarize the entities that will be impacted by this initiative's Master Provider Directory. Have these entities agreed to change or interface their systems in order to implement the Master Provider Directory? If not, please summarize the plan.

The Master Provider Directory, (similar to the Unique Person Identifier) will eventually be offered "as-a-Service". Colorado's legislature mandated (HB 12-1052) that an accurate provider directory be developed and maintained. CDPHE requires this information, but other agencies would also benefit from a single, accurate "source of truth" for provider information, including CDHS and HCPF. In addition, hospitals and health systems, which struggle to keep an up-to-date provider database, would pay a subscription fee for accurate provider information. No entities will be "required" to change systems or interfaces (a "push" model), but rather, as this provider database becomes the "accurate source of truth for provider information, there will be demand for this data (a "pull" model).

**Initiative 3: Consent Management,
Automated and Integrated Consent Framework Initiative**

20. The budget request explains that this initiative is an advance pilot effort led by Colorado Regional Health Information Organization (CORHIO) and Quality Health Network (QHN) Health Information Exchanges. Will this initiative leverage some of the existing work or systems that CORHIO and QHN have already completed? If so, please describe.

Yes - the automated consent initiative will leverage existing efforts completed by our health information exchanges- Colorado Regional Health Information Organization (CORHIO) and Quality Health Network (QHN). Addition investment in health information infrastructure and information exchange is needed to scale these efforts statewide. Both organizations were involved in the creation of the Roadmap and are closely involved in defining requirements and strategy for this effort.

21. The budget request says that this initiative will use an extension of the advanced interoperability grant and other initiatives. Will other active projects, such as DHS's Interoperability project, have its funding impacted by this initiative?

DHS's Interoperability funding will not be impacted by these Initiatives. However, it's possible that the DHS Interoperability project would be a potential "customer" for the Unique Person Identification (MPI) system, the Master Provider Directory (MPD) system, and possibly the automated Consent Management solution.

**Initiative 4: Online Consumer Portal on Health Cost and Quality,
Colorado Consumer Portal for Health Initiative**

22. The budget request says that the "consumer portal strategy starts with alignment and coordination of existing assets, so that Coloradans have a central place to go that would help provide statistics and information to compare providers and health plans, and to understand cost, quality and service measures". Please summarize any existing systems the consumer portal might leverage or interface. Is this portal similar to other government portals? Have other states implemented this?

- a) *Colorado's future Consumer Portal for Health would differ from other Colorado citizen portals, in that many of the "sources" for this data are both internal, as well as external to the State and State systems. For instance, some of the data sources that the consumer portal could leverage include the following:*
- *Healthgrades⁵ quality scores for hospitals*

⁵ <https://www.healthgrades.com/>

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- HCAHPS⁶ Service Scores for hospitals
- Quality scores for health plans (NCQA⁷ data representing Medicare, Medicaid, and commercial plans)
- i) CIVHC⁸s Colorado All Payer Claims Database (Colorado cost data)
- b) Other states have implemented similar portals, including Fairhealth⁹ (NY), Connecticut¹⁰, Maryland¹¹, and Florida¹²

Initiative 5: Advance Health Information Exchanges (HIEs) Across Colorado, Colorado's Health Information Exchanges Infrastructure Initiative

23. The budget request says that “all appropriate providers have access to relevant information about those for whom they provide care and that consumers have access to their information. Colorado has two major HIE organizations - CORHIO and QHN - as well as other regional and health systems-specific data exchange activities. However, not all providers and residents have access to the same capabilities, services or service levels.” Does the Advance HIE have any dependencies with the Master Person Index initiative or the Master Provider Directory initiative? If so, please describe.

The Advance HIE Initiative is not dependent upon the Master Person Index (MPI), or Master Provider Directory (MPD) Initiatives. However, our HIEs may be possible “bidders” on the provision of a statewide MPI or MPD, as both our HIEs have these capabilities today.

Appendices:

- A. Preliminary Roadmap Timelines
- B. Executive Order
- C. Market Research – HIE Cost Savings Summary
- D. Market Research document

⁶ <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS.html>

⁷ <http://www.ncqa.org/Consumers.aspx>

⁸ <http://www.civhc.org/get-data/interactive-data/shop-for-care/>

⁹ <https://www.youcanplanforthis.org/>

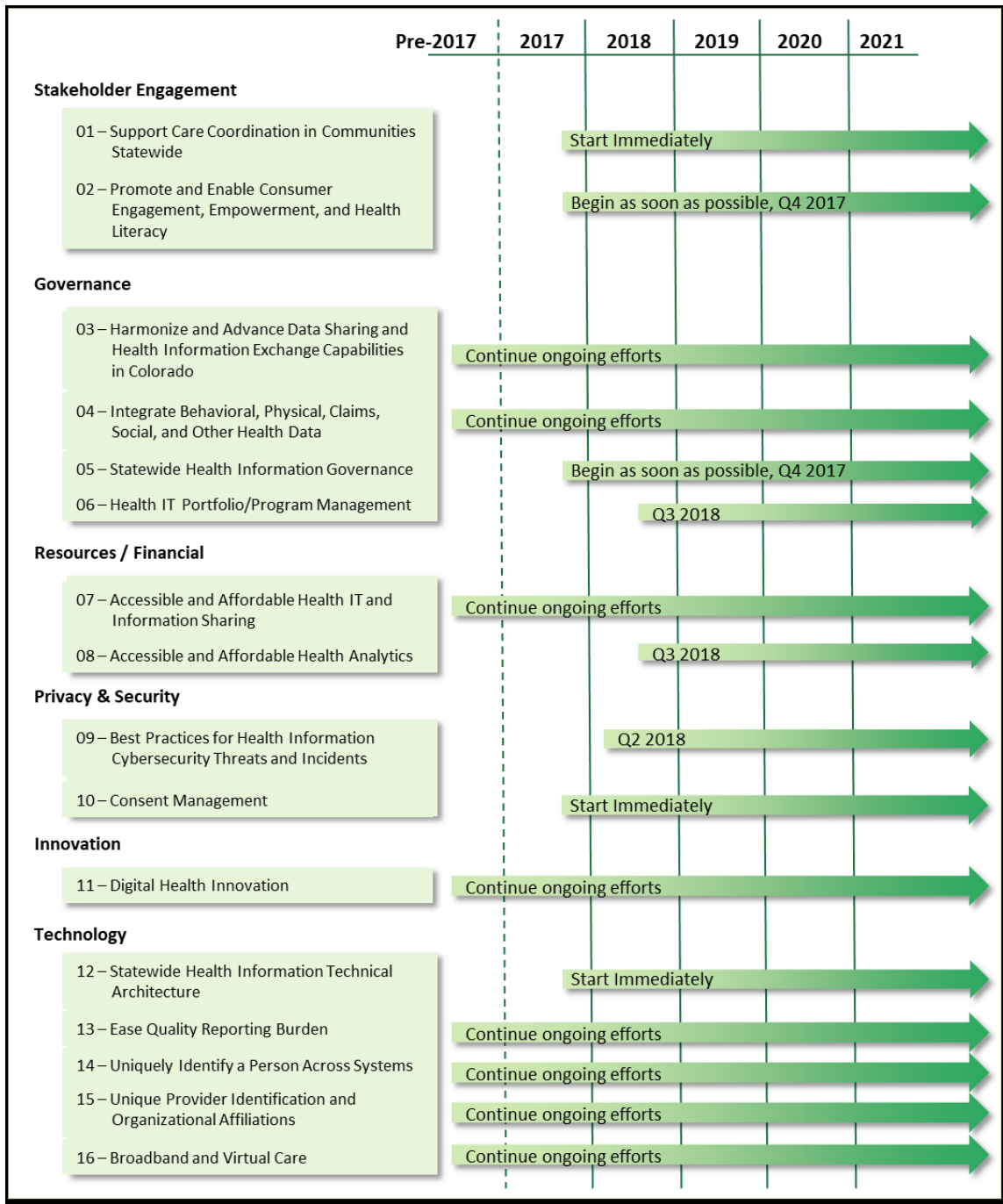
¹⁰ <http://consumerhealthchoices.org/ccwc/>

¹¹ <http://mhcc.maryland.gov/mhcc/pages/apcd/apcd/apcd.aspx>

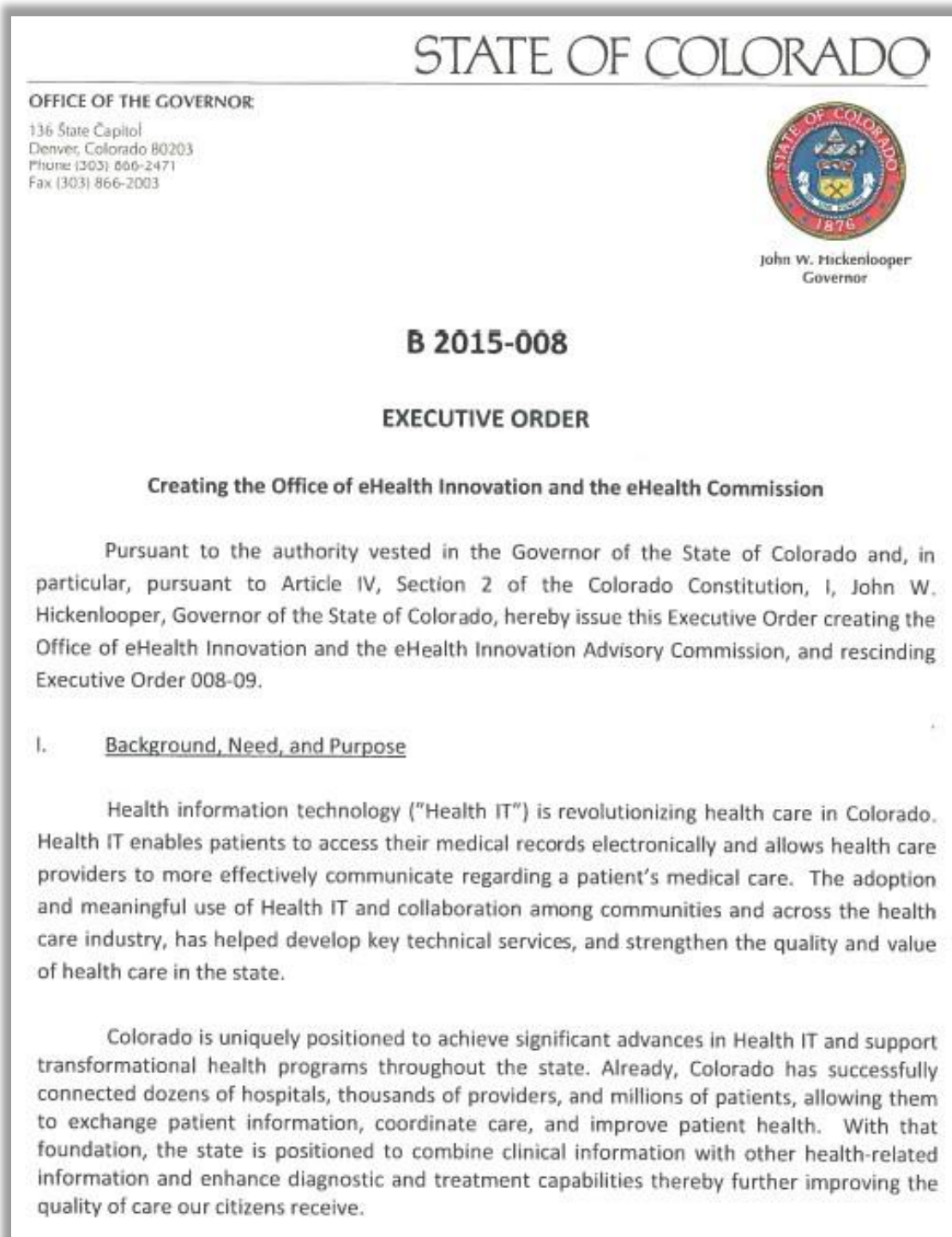
¹² <http://www.floridahealthfinder.gov/index.html#compareColl>

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APPENDIX A: PRELIMINARY ROADMAP PLAN (ALL INITIATIVES)



APPENDIX B: EXECUTIVE ORDER



To promote the expanded use of Health IT in Colorado, the state will:

1. Establish an open and transparent statewide collaborative effort to develop common policies, procedures, and technical approaches that will enhance the state's Health IT network;
2. Promote and advance data sharing by reducing or removing barriers to effective information sharing;
3. Support health innovation and transformation by enhancing Colorado's health information infrastructure; and
4. Improve health in Colorado by promoting the meaningful use of Health IT.

The next phase of effectively leveraging Health IT resources from the public and private sectors will require a new coordinated effort that facilitates the development of best practices and innovative approaches that improve patient health.

II. Directives and Declarations

A. Creation of The Office of eHealth Innovation

This executive order hereby creates the Office of eHealth Innovation (the "Office") within the Governor's office. The Office shall promote and advance the secure, efficient, and effective use of health information, and help to inform, incentivize, and influence future Health IT initiatives.

Pursuant to the Health Information Technology for Economic and Clinical Health (HITECH) Act, the Office is hereby designated as Colorado's Designated Entity to participate in the programs of the Office of the National Coordinator for Health Information Technology and other Health IT programs established by certain federal agencies.

The Office shall be led by a Director to be selected by the Governor and comprised of staff necessary to carry out the Office's mission. Staff shall be supported by funding from grants or state health programs. The Director shall report to the Governor or the Governor's designee. The Department of Health Care Policy and Financing shall serve as the administrative and fiscal agent for the Office.

The Office shall evaluate the state's Health IT needs and facilitate the use of public funds to enable all Coloradans to benefit from Health IT and health information exchange efforts. The Office shall coordinate relevant public and private stakeholders and Health IT programs across

state agencies and between state and federal projects. The Office shall evaluate functions to advance Health IT systems in Colorado and create transparency and accountability. The Office will not own or operate any technical infrastructure but will define the minimum criteria for qualified organizations that will provide state-level, common technical services supporting advanced health information interoperability.

The Director, in consultation with the eHealth Commission, shall advise and recommend policy and regulatory changes that will accelerate Health IT innovation in Colorado.

B. Creation of the eHealth Commission

There is hereby created, under the office of the Governor, the eHealth Commission (the "Commission"), to provide advice and guidance to the Office of eHealth Innovation on advancing Health IT in Colorado. The Commission shall support the implementation of the state's Health IT strategy and interoperability objectives by setting goals for Health IT programs and creating a process for developing common policies and technical solutions.

The Commission shall establish policies and procedures it deems appropriate for conducting its meetings. The Commission shall not be subject to the State Administrative Procedures act, C.R.S 24-4-101, *et seq.*, but shall be subject to the Colorado Open Records Act, 24-72-201, *et seq.*, and the Colorado Open Meetings Law, 24-6-401, *et seq.*

The Commission shall consist of no fewer than nine and no more than 15 members, appointed by the Governor, with statewide representation from urban and rural communities. Members shall serve three year terms. The members of the Commission shall include:

1. Between four and 10 representatives, who are not state employees, that collectively have experience and knowledge of as many of the following areas as practical:
 - primary health care delivery
 - behavioral health care delivery
 - health care facilities
 - health insurance
 - non-profit, Health IT-related community organizations
 - interoperability and data exchange
 - digital health technology
 - consumer engagement in health care
 - health care quality measures
2. The Director of the Office of eHealth Innovation;

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3. The Executive Director of the Department of Public Health and Environment or his or her designee;
4. The Executive Director of the Department of Health Care Policy and Financing or his or her designee;
5. The Executive Director of the Department of Human Services or his or her designee;
6. The Executive Director of the Governor's Office of Information Technology or his or her designee.

Members of the commission shall choose one representative to serve as the chair person.

The Director, with the advice of the Commission, may create work groups to advise the Commission and the Office on issues related to its mission. The Director and the Commission shall also coordinate with, and utilize the work of, other health transformation efforts.

III. Duration

Executive order 008-09 is hereby rescinded. This Executive Order shall remain in force until modified or rescinded by future Executive Order of the Governor.



GIVEN under my hand and the
Executive Seal of the State of
Colorado this sixth day of
October, 2015.

A handwritten signature in black ink, appearing to read "John W. Hickenlooper".

John W. Hickenlooper
Governor

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APPENDIX B: Market Research Summary – HIE Cost Savings

Health Information Exchange Cost Savings

Organization	Value Realized	How Accomplished	Aligns with Roadmap Initiative
Medicaid	<ul style="list-style-type: none"> Cost savings of \$283,477 over a four-month period 771 fewer bed days per 1,000 members 30% lower admission rates 67% reduction in emergency room testing 	Use of Health Information Exchange	Accessible and Affordable Health IT and Information Sharing
Medicare Emergency Care Costs	<ul style="list-style-type: none"> Cost savings of \$1 million in patient charges (\$2,000 per patient) 	Use of Health Information Exchange	Accessible and Affordable Health IT and Information Sharing
Emergency Department	<ul style="list-style-type: none"> Cost savings of \$1.9 million Reduced overall costs by \$1.07M Improved quality of care for 86.7% of patients Time savings of 120.8 minutes 	<ul style="list-style-type: none"> Use of Health Information Exchange Improved care coordination 	Support Care Coordination in Communities Statewide
Hospital Admissions	<ul style="list-style-type: none"> Reduction in total costs by 97.6% Cost savings of \$357,000 	<ul style="list-style-type: none"> Use of Health Information Exchange Improved provider access to patient data 	Accessible and Affordable Health IT and Information Sharing
Ambulatory Quality of Care	<ul style="list-style-type: none"> 57% increase in performance above regional benchmarks 	Use of Health Information Exchange	Digital Health Innovation (use of portal to view data)
Fraud and Abuse	<ul style="list-style-type: none"> Further health care services and resources Improved patient care Reduced redundancies and costs for insurers, programs, and federal government 	Use of Health Information Exchange	Accessible and Affordable Health IT and Information Sharing
Query Exchange Services	<ul style="list-style-type: none"> Increased assistance with Health Information Exchange coordination efforts 	Use of Health Information Exchange	Harmonize and Advance Data Sharing and Health Information Exchange Capabilities
Event Notification	<ul style="list-style-type: none"> 26.5% decrease in readmission rates Time efficiencies Improved care coordination Emergency and disaster response 	Alerts to providers of patient admission	Unique Person Identification
Provider Directory	<ul style="list-style-type: none"> Provide single source of data Reduction of data redundancies Production of complete and accurate data 	Use of Health Information Exchange	Unique Provider Identification and Organizational Affiliations

Literature Review on the Impact of Health IT Programs

With the growing prevalence of health IT services, the fundamental importance of delivering healthcare has become more apparent. In today's society there are many opportunities to improve medical services via hospitals and doctors through the use of electronic health records. By allowing access to patient records across providers, the quality and cost of care are greatly improved and accurate information is available for all patients allowing for more efficient and effective care.

More specifically, Medicaid agencies are tasked with the effective management of the complex medical care needed by their beneficiaries without limiting or cutting benefits. Data generated through these technologies will provide a range of research opportunities that can further inform and advance improvements in health care quality and efficiency.⁵ For Medicaid agencies, electronic health information exchange has been shown to reduce redundancies by catching duplicate tests, examinations, or procedures for patients, and inflated costs by erroneous or deliberately fraudulent billing. The money that is saved by preventing redundancies and fraud can be applied to further healthcare services and resources and improved patient care, while reducing costs for insurers, program administrators, and the federal government.⁶

In one example, the cost benefits associated with the various services and initiatives included under the broad umbrella of Health IT ranged from a reduction in avoided hospital admissions and radiology services totalling \$283,477¹ over a four month period, to 771 fewer bed days per 1,000 members³ and reduced average length of stay with the odds of admission being 30 percent lower when the system was accessed⁴. Utilization of Health IT has also been shown to reduce emergency room testing upwards of 67 percent.² Savings in the emergency room for the Medicare population was found to be in excess of \$1 million dollars in patient charges or nearly \$2,000 per patient.⁸

In addition, health IT can also serve as a vehicle for information sharing during times of disaster. For example, in the wake of Hurricane Harvey, Texas witnessed the power of information sharing during this incredibly challenging natural disaster.⁷ Health IT was essential in helping to track the location of patients who sought medical attention and providing them accurate and timely care.

As payors look towards new care models and new payment models, Health IT provides the infrastructure necessary to support innovation. A successful transition to value-based care will require effective partnerships between healthcare providers and health IT developers as well as among providers themselves to ensure that current and future EHR and health IT infrastructure lead to improved care delivery.¹⁰

Health care delivery is arguably the most complex industry in existence but Information technology has transformative power. Health IT can accelerate processes and make them less error-prone and more efficient. It can offer new services that overcome distance, time and the need for a physical structure, such as a storefront. It can deliver information instantly and in novel ways to decision-makers. And it can run algorithms to monitor equipment and correct minor problems before they become major problems. The opportunities afforded through Health information technology (IT) has

the potential to improve the health of individuals and the performance of providers, yielding improved quality, cost savings, and greater engagement by patients in their own health care.⁹

Health Information Exchange

1. *The Financial Impact of Health Information Exchange on Emergency Department Care*

<https://www.ncbi.nlm.nih.gov/pubmed/22058169>

OBJECTIVE:

To examine the financial impact of health information exchange (HIE) in emergency departments (ED).

MATERIALS AND METHODS:

We studied all ED encounters over a 13-month period in which HIE data were accessed in all major emergency departments in Memphis, Tennessee. HIE access encounter records were matched with similar encounter records without HIE access. Outcomes studied were ED-originated hospital admissions, admissions for observation, laboratory testing, head CT, body CT, ankle radiographs, chest radiographs, and echocardiograms. Our estimates employed generalized estimating equations for logistic regression models adjusted for admission type, length of stay, and Charlson co-morbidity index. Marginal probabilities were used to calculate changes in outcome variables and their financial consequences.

RESULTS:

HIE data were accessed in approximately 6.8 percent of ED visits across 12 EDs studied. In 11 EDs directly accessing HIE data only through a secure Web browser, access was associated with a decrease in hospital admissions (adjusted odds ratio (OR)=0.27; p<0001). In a 12th ED relying more on print summaries, HIE access was associated with a decrease in hospital admissions (OR=0.48; p<0001) and statistically significant decreases in head CT use, body CT use, and laboratory test ordering.

DISCUSSION:

Applied only to the study population, HIE access was associated with an annual cost savings of \$1.9 million. Net of annual operating costs, HIE access reduced overall costs by \$1.07 million. Hospital admission reductions accounted for 97.6 percent of total cost reductions.

CONCLUSION:

Access to additional clinical data through HIE in emergency department settings is associated with net societal saving.

2. *Health Information Exchange Saves \$1 Million in Emergency Care Costs for Medicare⁸*

<http://newsroom.acep.org/2013-10-14-Health-Information-Exchange-Saves-1-Million-in-Emergency-Care-Costs-for-Medicare>

New research shows that having access to data from a health information exchange (HIE) improved the quality of emergency care and saved more than \$1 million in patient charges, or nearly \$2,000 per patient, according to a study presented in Seattle at the annual meeting of the American College of Emergency Physicians.

3. *Observational Study and Estimate of Cost Savings from Use of a Health Information Exchange in an Academic Emergency Department*¹

<https://www.ncbi.nlm.nih.gov/pubmed/24071033>

BACKGROUND:

Federal initiatives to improve health care information sharing have led to the development of a new type of regional electronic medical record known as a health information exchange (HIE).

OBJECTIVE:

To investigate the ability of an HIE to decrease health services use for emergency department (ED) patients.

METHODS:

An observational, prospective study was performed using a voluntary, anonymous survey among clinicians at an urban academic ED. All ED clinicians were eligible to participate. Survey items addressed clinician perception of whether information from the HIE avoided the use of hospital resources, improved quality of care, and reduced length of stay (LOS). Cost savings were estimated by multiplying the number of services the clinicians completing the survey reported they avoided through use of the HIE by the costs of those services at our facility. The study was approved by the Institutional Review Board at the study site.

RESULTS:

The study was conducted between August and December of 2011. There were 18,529 patient encounters during the study period and 60 clinicians at the study site who were eligible to participate. The clinicians consulted the HIE for 5.39 percent of these encounters (998 patients). Surveys were completed by the clinicians caring for 13.8 percent (n = 138) of these patients. Of the completed surveys, 76 percent (105 surveys) referenced patients for whom the HIE was found to contain information on the patient under care by the clinician participant. These 105 patients formed the sample on which our analysis was based. Within this sample of patients, the following studies were reported to have been avoided by the clinicians participating in our survey: values are percent of patients for whom a study was reported to have been avoided (actual number of studies avoided): laboratory/microbiology: 30.5 percent (32 studies); radiologic studies: 47.6 percent (50 studies); consultations: 19 percent (20 consultations); and admissions: 11.4 percent (12 admissions). Calculated cost savings based on these estimates were as follows: laboratory/microbiology: \$462.85; radiologic studies: \$160,893.00; consultations: \$3,990.00; and admissions: \$118,131.84. Total savings: \$283,477. Clinicians participating in the study reported improved quality of care for 86.7 percent of their patients, as well as a mean time savings of 120.8 minutes.

CONCLUSIONS:

According to clinician estimates, use of an HIE in this urban academic ED resulted in reduced use of hospital resources, noteworthy cost savings, decreased LOS, and improved quality of care. Limitations included the observational nature of the study, selection bias, the Hawthorne effect, and cost estimates being from a single institution. Allowance was not made for additional services used because of information obtained from the HIE.

4. *Association Between Use of a Health Information Exchange System and Hospital Admissions*⁴

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3974257>

OBJECTIVE:

Relevant patient information is frequently difficult to obtain in emergency department (ED) visits. Improved provider access to previously inaccessible patient information may improve

the quality of care and reduce hospital admissions. Health information exchange (HIE) systems enable access to longitudinal, community-wide patient information at the point of care. However, the ability of an HIE to avert admissions is not well demonstrated. We sought to determine if HIE system usage is correlated with a reduction in admissions via the ED.

METHODS:

We identified 15,645 adults from New York State with an ED visit during a 6-month period, all of whom consented to have their information accessible in the HIE system, and were continuously enrolled in two area health plans. Using claims, we determined if the ED encounter resulted in an admission. We used the HIE's system log files to determine usage during the encounter. We determined the association between HIE system use and the likelihood of admission to the hospital from the ED and potential cost savings.

RESULTS:

The HIE system was accessed during 2.4 percent of encounters. The odds of an admission were 30 percent lower when the system was accessed after controlling for confounding (odds ratio = 0.70; 95%CI = 0.52, 0.95). The annual savings in the sample was \$357,000.

CONCLUSION:

These findings suggest that the use of an HIE system may reduce hospitalizations from the ED with resultant cost savings. This is an important outcome given the substantial financial investment in interventions designed to improve provider access to patient information in the U.S.

5. *Health Information Exchange, Health Information Technology Use, and Hospital Readmission Rates*

<https://www.ncbi.nlm.nih.gov/pubmed/22195120>

The Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 offers significant financial incentives to hospitals that can demonstrate "meaningful use" of EHRs. Reduced hospital readmissions are an expected outcome of improved care coordination. Increased use of HIT, and, in particular, participation in HIE are touted as ways to improve coordination of care. In a 2007 national sample of U.S. hospitals, we evaluated the association between hospitals' HIE and HIT use and 30-day risk adjusted readmission rates for acute myocardial infarction (AMI), heart failure, and pneumonia. We found that hospital participation in an HIE was not associated with lower hospital readmission rates; however, high levels of electronic documentation (an aspect of HIT use) were associated with modest reductions in readmission for heart failure (24.6 percent vs. 24.1 percent P=.02) and pneumonia (18.4 percent vs. 17.9 percent, P=.003). More detailed data on participation in HIE are necessary to conduct a more robust assessment of the relationship between HIE and hospital readmission rates.

6. *Does Health Information Exchange Reduce Redundant Imaging? Evidence from Emergency Departments²*

<https://www.ncbi.nlm.nih.gov/pubmed/24374414>

BACKGROUND:

Broad-based electronic health information exchange (HIE), in which patients' clinical data follow them between care delivery settings, is expected to produce large quality gains and cost savings. Although these benefits are assumed to result from reducing redundant care, there is limited supporting empirical evidence.

OBJECTIVE:

FY 2018-19 IT Capital Construction Requests

To evaluate whether HIE adoption is associated with decreases in repeat imaging in emergency departments (ED).

DATA SOURCE/STUDY SETTING:

ED discharge data from the State Emergency Department Databases for California and Florida for 2007-2010 were merged with Health Information Management Systems Society data that report hospital HIE participation.

METHODS:

Using regression with ED fixed effects and trends, we performed a retrospective analysis of the impact of HIE participation on repeat imaging, comparing 37 EDs that initiated HIE participation during the study period to 410 EDs that did not participate in HIE during the same period. Within three common types of imaging tests [computed tomography (CT), ultrasound, and chest x-ray], we defined a repeat image for a given patient as the same study in the same body region performed within 30 days at unaffiliated EDs.

RESULTS:

In our sample, there were 20,139 repeat CTs (representing 14.7 percent of those cases with CT in the index visit), 13,060 repeat ultrasounds (20.7 percent of ultrasound cases), and 29,703 repeat chest x-rays (19.5 percent of x-ray cases). HIE was associated with reduced probability of repeat ED imaging in all three modalities: -8.7 percentage points for CT [95% confidence interval (CI): -14.7, -2.7], -9.1 percentage points for ultrasound (95% CI: -17.2, -1.1), and -13.0 percentage points for chest x-ray (95% CI: -18.3, -7.7), reflecting reductions of 44 percent - 67 percent relative to sample means.

CONCLUSIONS:

HIE was associated with reduced repeat imaging in EDs. This study is among the first to find empirical support for this anticipated benefit of HIE.

7. *"Hidden" Value: How Indirect Benefits of Health Information Exchange Further Promote Sustainability³*

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4031695>

BACKGROUND:

Health information exchanges (HIE) have already demonstrated direct value in controlling the costs associated with utilization of emergency department services and with inpatient admissions from the emergency department. HIEs may also affect inpatient admissions originating from outside of the emergency department.

OBJECTIVE:

To assess if a potential association exists between a community-based HIE being used in hospital emergency departments and inpatient admissions emanating from outside of the emergency department.

METHODS:

The study design was observational, with an eligible population of fully insured plan members who sought emergency department care on at least two occasions over the study period between December 2008 and March 2010. Utilization data, obtained from medical and pharmacy claims, were matched to a list of emergency department utilizers where HIE

querying could have occurred. Of the eligible members, 1,482 underwent propensity score matching to create two 325-member groups— (1) a test group in which the HIE database was queried for all members in all of their emergency department visits, and (2) a control group in which the HIE database was not queried for any of the members in any emergency department visit.

RESULTS:

A post-propensity matching analysis showed that although the test group had more admissions per 1,000 members overall (199 more admissions per 1,000 members) than the control group, these admissions might have been more appropriate for inpatient treatment in general. The relative risk of an admission by the time of a first emergency department visit was 28 percent higher in the control group than the test group, although by the time of a second emergency department visit, it was only 8 percent lower in the control group. Moreover, test group admissions resulted in less time spent as inpatients, which was denoted by bed days per 1,000 members (771 fewer bed days per 1,000 members) and by average length of stay (4.27 days per admission for all admissions and 0.95 days per admission when catastrophic cases were removed).

8. *Health Information Exchange and Ambulatory Quality of Care*

<https://www.ncbi.nlm.nih.gov/pubmed/23646072>

BACKGROUND:

Health information exchange is a national priority, but there is limited evidence of its effectiveness.

OBJECTIVE:

To determine the effect of health information exchange on ambulatory quality.

METHODS:

We conducted a retrospective cohort study over two years of 138 primary care physicians in small group practices in the Hudson Valley region of New York State. All physicians had access to an electronic portal, through which they could view clinical data (such as laboratory and radiology test results) for their patients over time, regardless of the ordering physician. We considered 15 quality measures that were being used by the community for a pay-for-performance program, as well as the subset of eight measures expected to be affected by the portal. We adjusted for 11 physician characteristics (including health care quality at baseline).

RESULTS:

Nearly half (43 percent) of the physicians were portal users. Non-users performed at or above the regional benchmark on 48 percent of the measures at baseline and 49 percent of the measures at follow-up ($p = 0.58$). Users performed at or above the regional benchmark on 57 percent of the measures at baseline and 64 percent at follow-up ($p < 0.001$). Use of the portal was independently associated with higher quality of care at follow-up for those measures expected to be affected by the portal ($p = 0.01$), but not for those not expected to be affected by the portal ($p = 0.12$).

CONCLUSIONS:

Use of an electronic portal for viewing clinical data was associated with modest improvements in ambulatory quality.

9. *Hospitalization Event Notifications and Reductions in Readmissions of Medicare fee-for-service Beneficiaries in the Bronx, New York*

<https://academic.oup.com/jamia/article-abstract/24/e1/e150/2907910/Hospitalization-event-notifications-and-reductions?redirectedFrom=PDF>

OBJECTIVE:

Follow-up with a primary care provider after hospital discharge has been associated with a reduced likelihood of readmission. However, primary care providers are frequently unaware of their patients' hospitalizations. Event notification may be an effective tool for reducing readmissions by notifying primary care providers when their patients have been admitted to and discharged from a hospital.

MATERIALS AND METHODS:

We examined the effect of an event notification system on 30-day readmissions in the Bronx, New York. The Bronx has among the highest readmission rates in the country and is a particularly challenging setting to improve care due to the low socioeconomic status of the county and high rates of poor health behaviors among its residents. The study cohort included 2,559 Medicare fee-for-service beneficiaries associated with 14 141 hospital admissions over the period January 2010 through June 2014. Linear regression models with beneficiary-level fixed-effects were used to estimate the impact of event notifications on readmissions by comparing the likelihood of rehospitalization for a beneficiary before and after event notifications were active.

RESULTS:

The unadjusted 30-day readmission rate when event notifications were not active was 29.5 percent compared to 26.5 percent when alerts were active. Regression estimates indicated that active hospitalization alert services were associated with a 2.9 percentage point reduction in the likelihood of readmission (95% confidence interval: -5.5, -0.4).

CONCLUSION:

Alerting providers through event notifications may be an effective tool for improving the quality and efficiency of care among high-risk populations.

10. *The Benefits of Health Information Exchange Platforms: Measuring the Returns on a Half a Billion Dollar Investment*

https://www.brookings.edu/wp-content/uploads/2016/06/hie_returns.pdf

To have a clear understanding about the benefits of HIE platforms, the volume of available data and the investments by medical providers to meaningfully engage in HIE should be taken into account. This is the first study in which access to an HIE platform was provided to all of the patients in a treatment group, while the care of the others in the control group did not include querying an HIE platform. Moreover, due to the high participation rate of providers of medical data, a relatively comprehensive medical history of patients was available on the RHIO's database. Due to this feature of the trial design, endogeneity and confounding effects are avoided and thus a causal link between querying RHIO's database and outcome measures can be established. According to this analysis, querying RHIO's database is associated with significant utilization reduction in ED settings. In the first ED setting, querying RHIO's database is associated with respectively, a 25 percent and 26 percent reduction in the estimated number of laboratory tests and radiology examinations. In the second ED setting, querying RHIO's database is associated with a 47 percent reduction in the estimated number of radiology examinations.

Fraud and Abuse

11. *How Electronic Health Information Exchange (HIE) Can Reduce Health-Care Fraud*⁶

<https://medium.com/@ElizabethKStepp/how-electronic-health-information-exchange-hie-can-reduce-health-care-fraud-213a253ab252>

Overall for the American health-care system, electronic health information exchange has been shown to reduce redundancies by catching duplicate test, examination, or procedures for patients, and inflated costs by erroneous or deliberately fraudulent billing. The money that is saved by preventing redundancies and fraud can be applied to furthering health-care services and resources, improving patient care, while reducing costs for insurers, program administrators and the federal government. It is a system that will save costs, and provide efficiency that enables the health-care system in the United States to serve more patients, with better quality care.

12. *Clinical Health Information Technologies and the Role of Medicaid*⁵

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4194977>

Medicaid agencies pay for health care services for the poorest, sickest, and most complex populations in the U.S. The benefits associated with the appropriate use of HIT and HIE offer significant promise for Medicaid agencies to ensure the effective management of the complex medical care needed by their beneficiaries without limiting or cutting benefits. In addition, data generated through these technologies will provide a range of research opportunities that can further inform and advance improvements in health care quality and efficiency.

There are many areas where Medicaid represents a natural leverage point for a national HIT strategy. Its disproportionate influence in certain provider settings, its position as one of the largest purchasers of health care in the nation, the significant IT investments made through the MMIS, and most importantly, its role in supporting the health and well-being of U.S. citizens in need, positions Medicaid as a key player in facilitating the universal adoption and appropriate use of HIT and HIE. With consistent support and leadership from Federal and State policymakers, Medicaid can be an important contributor to a national health information infrastructure that will support safer, higher quality health care, and better health outcomes for all.

Natural and/or Man Made Disasters

13. *Evaluation of State Health Information Exchange Cooperative Agreement Program; Case Study Report: Experiences from Texas in Enabling Health Information Exchange (HIE)*

https://www.healthit.gov/sites/default/files/tx_casestudyreport_final.pdf

Conclusion:

The geographical makeup and diversity of Texas have greatly contributed to the development of a three-pronged, market-based approach to the state's Cooperative Agreement Program. The THSA funds 12 local HIOs throughout the state, allowing them to provide services based on the needs of their individual communities. HIOs are encouraged to engage with a wide variety of key stakeholders in their regions, particularly with large health systems, to ensure the services they provide are creating a value-add for both market relevance and sustainability. Additionally, Texas's white space program provides an innovative solution to tackle the issue of connecting providers in the vast rural regions of "white space" and helping them meet MU requirements. While the future of the Local HIE Grant Program seems promising, as of March 2012, the white space program was not seeing demand from providers.

The state has delayed offering state-level services so they can focus on bolstering and expanding local HIO efforts. Given the size and diversity of the healthcare market in Texas, the state's

approach has strong support from stakeholders; however, the future of the state's role in HIE and the sustainability of the HIOs remains uncertain. Changing dynamics in the healthcare market and in state and federal legislation have shifted the traditional relationships between hospitals and ambulatory providers. The creation of Nonprofit Health Corporations, to bypass the prohibition on the corporate practice of medicine, allows the creation of networks of hospitals and ambulatory care providers, many of whom have an interest in a growing private HIE market. Furthermore, changes spurred by the ACA have encouraged hospitals to start developing ACOs. These changes may challenge the viability of community-based HIOs and state-level services; thus, adequate state planning, the strategic offering of in-demand services, and stakeholder participation is critical to the program's longevity.

14. HIETexas Continuing Query Exchange Services to Support Hurricane Relief⁷

<http://www.thsa.org/august-2017/hietexas-continuing-query-exchange-services-to-support-hurricane-relief-efforts/>

As Texas moves forward in the coming weeks to deal with the immediate aftermath of Hurricane Harvey, there is a need to continue offering statewide query-based Health Information Exchange (HIE) services. We have all witnessed the power of information sharing during this incredibly challenging natural disaster. As a result, the Texas Health Services Authority (THSA) is announcing it will continue to offer query-based HIE services to assist in HIE coordination efforts.

Emergency and disaster response is the utmost important use case for the need of HIE, and continuing this service as recovery operations continue will allow patients' health information to follow them regardless of where they receive care.

15. Texas HIE Leaders Activate Capabilities to Support Healthcare Providers in the Wake of Harvey

<https://www.healthcare-informatics.com/article/hie/healthcare-informatics-exclusive-harvey-devastates-houston-texas-hie-leaders-move-help>

What should the CIOs, CMIOs, and other healthcare IT leaders in hospitals, medical groups, and health systems, be thinking about as they reflect on what's going on right now in Texas? "A few things," van Oordt said. "What I saw yesterday in the shelters was reflective of how an emergency can be handled. In one case, I was at a middle school, where 800 evacuees had gone. The technology available at that point and in that place was very minimal. They didn't have a fax or a PC, so one of the first things that comes to mind is that we need to make access to patient history fit that workflow. Something that comes to mind in that context is a phone-based app, because that's what most of the nurses already have and make use of. And the thinking is that you have essential information like allergies and medications and recent encounters, available through this phone app, and then later, you could deploy other features in such an app, as needed."

More broadly, van Oordt said, "This situation shows heart and soul where health information comes is critically needed. And this is the first major incident that's happened in the five years since Phil and I first worked together. My feeling is that patient information should be an available staple for emergency care. This is the ultimate use case for having patient information available. Patients are stressed out and providers are stressed out. This really is a staple of emergency care."

Meanwhile, Kelly Hoover Thompson, who was named SHIEC's CEO just over a week ago, told Healthcare Informatics, "This is the ultimate example of HIE's vital role and value to a community. It is how we support patient care, when a patient is facing some of their most critical and

vulnerable life moments. This is why SHIEC exists, to take the greatest minds in HIE across the country, to make it work, and advance it, and educate people.”

16. Hurricane Sandy Proves the Value of Health IT Infrastructure, State Info Exchanges

<https://medcitynews.com/2012/10/hurricane-sandy-underscores-new-yorks-health-information-exchange-and-data-storage-logistics/>

New York City hospitals’ healthcare IT systems were severely tested in the grips of one of the worst storms to hit the city. Hurricane Sandy will serve as a reminder of the importance of having electronic medical records and access to a healthcare information exchange. For some hospitals, it will offer valuable lessons on data storage logistics and how their IT networks (and back-up generators) perform in a crisis.

Master Provider Directory

17. Inaccurate Provider Directories Create Barriers to Care

<http://managedhealthcareexecutive.modernmedicine.com/managed-healthcare-executive/news/inaccurate-provider-directories-create-barriers-care>

Many health plans still rely on legacy systems where provider data is stored in multiple, disconnected databases. As business requirements have evolved, organizations have implemented incremental stop-gap measures to address data limitations, but these don’t address the core challenge: the lack of a single source of truth.

Therefore, to create directories, provider data must be cross-referenced against multiple systems, which means it’s more likely to contain redundancies and incomplete or incorrect data.

For example, health plans often update provider data annually as part of the contract and credentialing process, using this information to populate provider directories. For providers, documenting this information takes time as a detailed record can track up to 380 distinct line items, including service locations, billing locations, payment locations, specialties, certifications, affiliations, office hours, and languages spoken.

From a standards perspective, it’s not unusual that the provider’s information doesn’t conform to the data structure required by the health plan. Take, for example, whether a provider is accepting new patients. Most health plans capture this data as a binary—yes or no—field, but the reality can be more nuanced. A provider specializing in a certain branch of medicine may be willing to accept patients that meet certain criteria, but not the general population. Or the specialist may be able to accommodate new patients at one service location, but not at another.

Payment Models

18. 3 Strategies for Supporting Value-Based Care with Healthcare Analytics

<https://www.beckershospitalreview.com/healthcare-information-technology/3-strategies-for-supporting-value-based-care-with-healthcare-analytics.html>

But we’re still in the infancy of value-based care. The key to taking value-based care to the next level is data—specifically, leveraging the value of clinical and administrative data that exist in both payer and provider organizations. It demands payers, employers and providers to use the

right tools—not only to integrate and analyse data, but also to share it in ways that are meaningful, providing physicians with actionable information to improve care.

19. Implementation of Value-Driven Outcomes Program Associated with Reduced Costs, Improved Quality

https://www.eurekalert.org/pub_releases/2016-09/tjnj-iov090816.php

Vivian S. Lee, M.D., Ph.D., M.B.A., of the University of Utah, Salt Lake City, and colleagues measured quality and outcomes relative to cost from 2012 to 2016 at University of Utah Health Care. Clinical improvement projects included total hip and knee joint replacement, hospitalist (physicians who practice in the inpatient setting) laboratory utilization, and management of sepsis. Physicians were given access to a tool with information about outcomes, costs (not charges), and variation and partnered with process improvement experts.

20. Health IT Tools, Capabilities Required for Value-Based Care¹⁰

<https://ehrintelligence.com/news/health-it-tools-capabilities-required-for-value-based-care>

A successful transition to value-based care will require effective partnerships between healthcare providers and health IT developers as well as among providers themselves to ensure that current and future EHR and health IT infrastructure lead to improved care delivery.

That was the message delivered by the keynote speaker at last week's Value-Based Care Summit in Chicago.

"Technology is a critically important driver of value-based care. If we don't have functional systems in place — technology that is connected, easy to use, provides a free flow of information across systems — then it will be impossible to effectively migrate to a value-based care model," said American Medical Association Board of Trustees Secretary Jesse M. Ehrenfeld, MD, MPH.

General

21. Managing Complexity with Health Care Information Technology⁹

<http://www.hhnmag.com/articles/6094-managing-complexity-with-health-care-information-technology>

Information technology has transformative power. It can accelerate processes and make them less error-prone and more efficient. It can offer new services that overcome distance, time and the need for a physical structure, such as a storefront. It can deliver information instantly and in novel ways to decision-makers. And it can run algorithms to monitor equipment and correct minor problems before they become major problems.

Fiscal Year 2018-19 Information Technology Request

Office of Information Technology

Human Resource Information System

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2015-045

Approved Program Plan?

N/A

Date Approved:

The Governor's Office of Information Technology (OIT) is managing the project in partnership with the Department of Personnel and Administration (DPA).

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
OSPB	2 of 7	Recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$34,177,330	\$7,414,260	\$0	\$0	\$41,591,590
Total	\$34,177,330	\$7,414,260	\$0	\$0	\$41,591,590

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$1,755,319	\$1,384,914	\$0	\$0	\$3,140,233
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$2,478,098	\$816,459	\$0	\$0	\$3,294,557
Contingency	\$1,038,892	\$1,022,740	\$0	\$0	\$2,061,632
Software Acquisition	\$28,905,021	\$4,190,147	\$0	\$0	\$33,095,168
Total	\$34,177,330	\$7,414,260	\$0	\$0	\$41,591,590

PROJECT STATUS

This is a continuation project. In January 2017, the department discovered significant issues with the interfaces between the time and leave tracking component and the other components of the project. In response, the department submitted a FY 2017-18 supplemental request (\$2,888,529 CCF), which was recently approved by the Joint Budget Committee (JBC) and is reflected in this request. The JBC also recommended that the Office of the State Auditor evaluate the procurement process for the project.

PROJECT DESCRIPTION / SCOPE OF WORK

OIT is requesting additional state funds to replace the time and leave tracking component of the Human Resource Information System (HRIS) project, plus related staff and support costs. OIT explains that time and leave tracking functionality typically includes: Family and Medical Leave Act reporting; employee leave accrual balances; pay differences, including compliance with the Fair Labor Standards Act; overtime pay; and employee scheduling. OIT and DPA are currently implementing four critical components of the enterprise solution through third-party vendors:

- statewide time and leave tracking;
- payroll processing;

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- performance and personnel management; and
- a single-source statewide database for employee and position information.

Specifically, the FY 2017-18 supplemental request and the FY 2018-19 capital IT budget request include additional funds related to:

- time and leave tracking (\$6,966,429);
- project implementation extension for personnel administration and performance management components (\$980,000);
- integration and storage (\$721,052);
- term-limited state staffing (\$620,280);
- term-limited state project support extension (\$816,459); and
- contingency and other costs (\$198,569).

PROJECT JUSTIFICATION

In 2013, the state executed a master agreement with a third party vendor after many state agencies showed a critical need for a centralized time and leave tracking solution. Since then, certain departments have implemented a time and leave tracking solution, which interfaces with the Colorado Personnel and Payroll System (CPPS). In May 2015, OIT issued a request for proposal (RFP) for a human resources personnel administration and performance management solution. In March 2016, OIT canceled the RFP due to responses from vendors that exceeded available funds, and a second RFP was issued. In October 2016, contracts were awarded for the payroll processing and performance and personnel management components of the project.

OIT explains that the HRIS project will provide a simpler, more rational and integrated system that will automate several human resource business processes. OIT states that current human resource processes are different across state agencies, with agencies using manual procedures across approximately 80 different human resource applications. Additionally, CPPS is an outdated 20-year-old common business oriented language (COBOL) system.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

OIT states that if the budget request is approved, the vendor will integrate the time and leave tracking solution with other HRIS components, as well as the state's CORE financial system. The vendor also plans to add the following resources to the project:

- three additional time and leave analysts to work directly with the state's largest agencies;
- one time clock analyst;
- one self-service analyst;
- one time and leave subject matter expert; and
- two training analysts.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

OIT explains that although the proposed replacement of the time and leave tracking component will cost \$10.3 million in capital IT funding to implement, it is estimated to save \$6.4 million in capital and operating expenses over the next ten years, and \$709,943 per year thereafter. OIT further explains that the new time and leave solution requires lower operating, maintenance, and licensing costs than the existing time and leave tracking system.

SECURITY AND BACKUP / DISASTER RECOVERY

OIT states that all IT projects follow the OIT project management process, which requires a detailed review of and plan for data security and disaster recovery.

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Accessibility compliance. OIT says that the vendor will comply with the mandates for non-visual access in compliance with Section 24-85-103, C.R.S., and will provide voluntary product accessibility templates to demonstrate its compliance with federal accessibility standards.

BUSINESS PROCESS ANALYSIS

OIT states that state agencies are currently using manual processes and custom or packaged solutions for time and leave tracking. The new time and leave tracking solution will improve business processes by reducing risk; increasing functionality; and improving the time period closing process.

OIT explains that the new solution reduces risk because it is designed to be integrated with other payroll and finance applications, thereby reducing implementation, upgrade, and incompatibility risks; reducing the number of custom interfaces; allowing applications to share data in real time; and simplifying vendor management. The new solution increases functionality by providing users with additional labor allocation levels. This will assist agencies in completing labor allocation efficiently and accurately without additional time consuming adjustments. The vendor plans to use a payroll accounting management hierarchy that allows several employee setup alternatives for both payroll and allocating costs. OIT also states that the time required for month-end and year-end financial closing procedures should decrease. As the state transitions to a two-week pay period, reducing the time required for financial close procedures will be necessary and may be a critical factor for complying with state and federal reporting deadlines.

PROJECT SCHEDULE

	Start Date	Completion Date
Develop and Configure	June 2017	March 2018
Testing	March 2018	September 2018
Project Completion		October 2018

OPERATING BUDGET

After additional capital investment, OIT expects annual operating costs to be reduced with the new time and leave tracking solution.

STAFF QUESTIONS AND ISSUES

See attached.

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Strategic IT Infrastructure Needs

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2019-147

Approved Program Plan?

N/A

Date Approved:

The Governor's Office of Information Technology (OIT) states that the project aligns with its strategies and policies. The request also aligns with OIT's five-year roadmap goals.

PRIORITY NUMBERS

Prioritized By

Priority

OSPB

3 of 7

Recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$5,122,000	\$5,264,000	\$0	\$10,386,000
Total	\$0	\$5,122,000	\$5,264,000	\$0	\$10,386,000

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$1,290,000	\$1,490,000	\$0	\$2,780,000
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$3,832,000	\$3,774,000	\$0	\$7,606,000
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$0	\$0	\$0	\$0
Software Acquisition	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$5,122,000	\$5,264,000	\$0	\$10,386,000

PROJECT STATUS

This is a new, never-before-requested project.

PROJECT DESCRIPTION / SCOPE OF WORK

OIT is requesting state funds for the first of a two-phase project to repair critical infrastructure at the Lakewood Data Center (LDC) and to improve its public cloud integration and security compliance.

Lakewood data center. OIT plans to upgrade the following critical infrastructure at the LDC:

- humidifiers;
- main circuit breaker;
- power distribution system;
- electrical system overhaul, including an uninterruptable power supply;
- network equipment;
- generators;
- cooling system;

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Strategic IT Infrastructure Needs

- fire suppression system; and
- other interior elements.

OIT states that these upgrades will help the office meet the requirements for server power, temperature, and humidity. According to OIT, these upgrades will help meet the goal of 100 percent availability and support for a spectrum of state services.

Infrastructure operations. OIT plans to update its services to its customers based on project goals of procurement and scalability. Project areas include:

- upgrading firewall functionality;
- integrating and expanding storage services for data recovery and archive platforms;
- implementing infrastructure integration with public cloud providers;
- implementing software for data center workload mobility;
- implementing self-service port functionality ;
- creating appropriate cost modeling based on resource consumption and service description; and
- adjusting operational support processes and alignment to reflect automated service delivery.

According to OIT, the office's goal is to have infrastructure in place to support faster turnaround for IT services and to provide more targeted automation.

PROJECT JUSTIFICATION

According to OIT, LDC infrastructure has not been updated in 30 years, is at risk of failure, and can no longer be maintained. OIT states that the upgrade will extend the life of LDC along with providing for integration with modern public cloud infrastructure service. The project will allow OIT to perform routine maintenance while the data center remains in service. According to OIT, an upgraded LDC allows it to establish cloud integrations, thereby allowing important application workloads to move to cloud-based services.

In addition, OIT states that the infrastructure modernization gives the department the ability to achieve true automated service delivery, which is demanded by their customers. The project aims to result in faster turnaround and a lower error rate for customers. According to OIT, this project is essential to keep up with technological advancements and ensure that the state does not face rising support costs and technological incompatibilities.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

OIT plans to implement the project in a two-year phased approach. Phase I will focus on hosting infrastructure; cloud integration; firewall upgrades and configuration; voice and data convergence plans; mainframe and storage archives; performance monitoring; server endpoint configuration; and workload migration. Phase II plans to continue these tasks along with installing a new generator and finishing cooling, security, and interior improvements at LDC.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

OIT did not quantify cost savings as required by House Bill 15-1266, but states that the project ensures infrastructure resources that support state agency programs and applications remain available, efficient, and flexible to meet the needs of the state.

Request for information (RFI) process. OIT issued a RFI for this project. RFI cost summaries ranged from \$4.3 to \$6.0 million. Based on the RFI response, and as reflected in the budget request, OIT increased generator capacity, reduced the estimate for electrical work, and increased costs for air conditioning and thermal work.

Project alternatives. According to OIT, the department considered five options for this project: complete off-site cloud service; maintenance only at LDC; consolidating equipment at LDC; repairing and upgrading the LDC; and building a new data center. OIT states that the off-site cloud service option was not viable due to security

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requirements. OIT determined that maintenance and consolidation options were undesirable due to the risk of equipment failure. OIT states that building a new data center is cost prohibitive and not in line with policy decisions to move away from data center ownership and towards cloud-based services. According to OIT, the department chose to repair and upgrade the existing LDC because it extends the life of the LDC and establishes cloud integration for effective off-site application workload.

SECURITY AND BACKUP / DISASTER RECOVERY

According to OIT, the project will provide upgraded, efficient, and seamless security, backup, and disaster recovery to its customers.

BUSINESS PROCESS ANALYSIS

According to OIT, the request is based on a 2009 engineering evaluation performed at the LDC. In addition, in 2011, OIT deployed first generation hosting infrastructure, creating a foundation for full hosting automation and modernization. OIT states that these steps now allows the department to implement its goal of achieving automated and scalable service delivery to state agencies.

PROJECT SCHEDULE

	Start Date	Completion Date
Phase I	July 2018	July 2020
Phase II	July 2019	July 2020
Completion		July 2020

OPERATING BUDGET

OIT plans to submit an ongoing maintenance operating budget request starting in FY 2020-21 to the Joint Budget Committee.

STAFF QUESTIONS AND ISSUES

1. What services are currently provided at and by the Lakewood Data Center (LDC)?

All 17 State agencies utilize the LDC as either a production or disaster recovery site, depending on each agency. Some of the functional systems supported at LDC include, but are not limited to:

- Automated Child Support Enforcement System (ACSES)
- AVATAR
- CCAR/Encounter
- Lagniappe Pharmacy aka (InteRx Pharmacy)
- LEAP Vendor Web
- Methadone Registry
- Special Connections
- State ID Module (SIDMOD)
- TMS (Treatment Management System)
- TRAILS
- CUBS (CDLE)
- MyUI Claimant
- MyUI Employer

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Strategic IT Infrastructure Needs

- SmartFile#
- SmartPay
- Tumbleweed
- ProMiles Oversize/ Overweight Permit System (COOPR)
- Colorado Electronic Disease Reporting System (CEDRS)
- Colorado Immunization Gateway (CIG)
- Colorado Immunization Gateway (CIG1) vendor Envision
- Laboratory Information Tracking System (LITS)
- VitalRecords-Colorado Vital Information System (COVIS)
- Women, Infants, Children (WIC) - Compass
- Colorado Outdoor Recreation Information System (CORIS)
- Customer Service Screens System
- Flood Decision Support System (Flood DSS)
- LECS-Law Enforcement Citations System (Parks)
- Operation Game Thief
- Violation Management System (VMS)
- C-SEAP
- COFRS
- CORE
- CPPS - Colorado Payroll and Personnel System
- Benefits Utilization System for Long term Care (BUS)
- DDDWeb
- Digital Trunk Radios (DTRS)
- Tax Processing (GENTAX)

2. The justification for some estimated costs in Table 1 is “vendor discussion” or “vendor workshop”. How many vendors were consulted? When were the vendor workshops conducted?

A combination of four different vendors and consulting firms were used to identify costs and requirements to utilize off-premise cloud services. The workshop, discussions and research was performed during fiscal year 2016-2017 over several months. The major areas of review included: the state’s infrastructure and design, common infrastructure needs that agencies were seeking off-premise, service request workflow, security compliance, the future of data centers, and industry trending and best practices.

3. Were state agencies (OIT’s customers) contacted to inform the infrastructure needs requested in this request?

The infrastructure improvements requested are all provided at a facility level and therefore apply to all of the LDC tenants in a general manner.

OIT communicated the need for infrastructure improvements to agency Budget Directors beginning in August 2017 and throughout the final development of the request. OIT also met and communicated with agency Deputy Directors as well. OIT also offered a tour of the LDC to budget directors and other agency stakeholders which was attended by staff from the Department of Regulatory Affairs, the Department of Human Services, the Department of Local Affairs, and the Department of Natural Resources. All attendees indicated support of this request proposed by OIT.

In addition, separate meetings with several of the larger LDC tenants, such as CDHS, were conducted to discuss future plans. These potential power and cooling requirements were taken into account when writing the RFI.

Fiscal Year 2018-19 Information Technology Request

Public Health and Environment

Electronic Birth Registration System Replacement

PROGRAM PLAN STATUS and OIT BEST PRACTICES

2018-019

Approved Program Plan?

N/A

Date Approved:

The Colorado Department of Public Health and Environment (CDPHE) says that the project aligns with the strategies and policies of the Governor's Office of Information Technology (OIT).

PRIORITY NUMBERS

<u>Prioritized By</u>	<u>Priority</u>	
DeptInst	1 of 1	
OSPB	5 of 7	Recommended for funding.

PRIOR APPROPRIATION AND REQUEST INFORMATION

<u>Fund Source</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
CCF	\$0	\$745,000	\$0	\$0	\$745,000
CF	\$0	\$1,695,000	\$0	\$0	\$1,695,000
Total	\$0	\$2,440,000	\$0	\$0	\$2,440,000

ITEMIZED COST INFORMATION

<u>Cost Item</u>	<u>Prior Approp.</u>	<u>FY 2018-19</u>	<u>FY 2019-20</u>	<u>Future Requests</u>	<u>Total Cost</u>
Land Acquisition	\$0	\$0	\$0	\$0	\$0
Professional Services	\$0	\$340,000	\$0	\$0	\$340,000
Construction	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$0
Miscellaneous	\$0	\$0	\$0	\$0	\$0
Contingency	\$0	\$100,000	\$0	\$0	\$100,000
Software Acquisition	\$0	\$2,000,000	\$0	\$0	\$2,000,000
Total	\$0	\$2,440,000	\$0	\$0	\$2,440,000

PROJECT STATUS

This is the second request for funding. Funding was also requested for FY 2017-18.

PROJECT DESCRIPTION / SCOPE OF WORK

CDPHE is requesting a combination of state and cash funds spending authority to implement a new electronic birth registration system. The department plans to purchase an off-the-shelf, web-based product, with support from a third party vendor. The new system business requirements include:

- a web-based portal for data exchange;
- Health Insurance Portability and Accountability Act (HIPAA) compliant electronic reporting;
- electronic billing capabilities;
- integration with electronic death reporting;
- data quality assurance capabilities;

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Electronic Birth Registration System Replacement

- data analysis reporting and functionality;
- records retention;
- the ability to issue certificates; and
- the ability to interact with state and local vital records systems.

The system will comply with all federal and state laws in order to protect privacy and unauthorized access to birth certificate data. The department issued a request for information (RFI) in 2017 and received four viable proposals. According to CDPHE, the web-based system will allow easier access for approved data providers and the 53 local vital records offices. Additionally, the department believes the new system will improve integration with the state's accounting and electronic death reporting and may potentially integrate with hospital electronic health records by utilizing data messaging standards to securely share clinical information. Finally, the department believes this new system will reduce human error risks, reduce double data entry, and streamline workflows.

Cash funds. The cash funds spending authority portion of this request requires a \$7 fee increase (\$17.75 to \$24.75) for three years for birth certificate issuance. After three years, the fee increase will be reevaluated. The department states that nationwide fees for birth certificates range from \$5 to \$34, with the average being \$17. CDPHE anticipates around 36,000 first birth certificates issued per year through FY 2020-21, enough to cover the cash funds portion of the request. According to CDPHE, the fee would need to be raised to \$24.00 to fund the ongoing maintenance of the existing system.

PROJECT JUSTIFICATION

The existing Colorado Vital Records Information System (COVIS) was implemented in 2007, but still runs on an original 2003 SQL sever platform. According to CDPHE, the system is outdated and unable to fulfill the needs of state and local records offices and data providers. Along with the inability to maintain data integrity, the current system prevents integration and does not meet data security standards. The current vendor contract for COVIS expires in 2019 and the state will continue to pay \$184,000 per year for system maintenance to a vendor for an outdated system that does not meet departmental needs.

COVIS is the only electronic mechanism for counties to issues birth certificates and needs to be updated for state and local records offices. According to CDPHE, if the current system fails, the department would need to issue paper birth certificates, which significantly delays the processing and submission of heath data used by other public health programs. The department states that failure to replace the system may lead to the inability to perform key business functions and maintain the integrity of data, the loss of revenue, and other risks related to operating unsupported IT infrastructure and software.

PROGRAM INFORMATION AND IMPLEMENTATION PLAN

CDPHE plans to undergo a request for proposal (RFP) process to select a new system vendor. Vendor selection will include input from OIT, data providers, data users, and state and local vital records personnel. The department states that the project will follow OIT direction and project management, along with conducting independent verification and validation (IV&V). CDPHE states that it will work with OIT and the selected vendor to ensure the vendor meets all state and federal laws regarding non-visual system access and IT accessibility standards.

COST SAVINGS / IMPROVED PERFORMANCE OUTCOMES

CDPHE estimates that the department will save 1,300 hours a year due to staff no longer having to answer questions regarding system account creation and password resets. Staff can use those hours on higher value activities, such as conducting site visits or creating training and education webinars. Additionally, the department states the new system will no longer require a dedicated, onsite vendor consultant. Finally, OIT will no longer need to assist CDPHE with sever maintenance, system updates, and setting up new user accounts.

SECURITY AND BACKUP / DISASTER RECOVERY

CDPHE states that the current system does not have a disaster recovery plan. The new web-based solution will

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ensure better data protection, security, and disaster recovery. According to CDPHE, the new system will comply with all OIT security policies.

BUSINESS PROCESS ANALYSIS

The department plans to address both internal and external users needs. Addressing these needs will improve the quality of data, make sure that specific workflow processes are working, and better protect the state's data. Additionally, the new system will further departmental goals of promoting excellence and creating a more efficient and effective experience for users and customers.

PROJECT SCHEDULE

	Start Date	Completion Date
RFP Process	Fall 2017	Fall 2018
System Development	2019	2020
Data Migration, System Testing, and Training	2020	2021
Ongoing Maintenance	2021	Ongoing

OPERATING BUDGET

CDPHE estimates an annual maintenance cost of \$488,000 for the new system. According to CDPHE, an operating budget request will be submitted to the Joint Budget Committee, if needed, once the system is implemented and actual maintenance costs are known.

STAFF QUESTIONS AND ISSUES

1. Who is the current CORVIS vendor?

The vendor for the COVIS system is Genesis Systems, Inc.

2. In FY 2017-18, the department requested funds for this project. The FY 2017-18 budget request included \$200,000 in federal funds which are not included in the FY 2018-19 request. Why are federal funds not available for the project in FY 2018-19?

The federal funds were available last year from existing grant funds for another project. Because of the nature of the birth system data, expenditures for the birth system would have been allowable under the terms of the grant. That grant has ended and the funds are no longer available.

3. The request narrative indicates that all Colorado birth information from 1910 to present will be moved from OIT servers to a new third party vendor's servers. Will the Chief Information Security Officer (CISO) evaluate and approve the transfer of the data and the third party vendor's security? If not, please explain.

Yes, the new system would follow OIT's gating process which would include a security review and plan.

4. Will the third party vendor be fedRAMP certified? In not, what other certifications will the vendor be required to hold?

It is not known whether or not the new system will be a cloud-based solution, so fedRAMP may not be applicable. The vendor will be required to meet all applicable OIT CISP and Cyber security policies.

5. Will the department be allowed internal or external security audits of the third party vendor? If not, how will security be managed?

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Yes, this would be addressed in the contract, OIT gating process, security plan, and contract monitoring process.

6. Is there a plan in place for the migration of older or corrupt data to the new web-based system?

This would be addressed in the requirements gathering phase once the contract has been awarded.

7. The narrative states that the current CORVIS contract expires in 2019 and the project timetable included in the request indicates project completion in 2021. What system will be responsible for issuing birth certificates from 2019 to 2021?

The Department has an amendment with Genesis to extend the current contract to 2020. If necessary, the Department would continue with one year contracts until the new system went live.